The Builder.

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ILLUSTRATIONS.

Tomb of Lord Henry Marney, Layer Marney Church.—From a Drawing by Mr. Arnold B. Mitchell ..... *Single-Page Ink-Photo.*
A Corner of Ely Cathedral.—From a Drawing by Mr. Arnold B. Mitchell ..... *Single-Page Ink-Photo.*
The Dudley Memorial, Worcester Cathedral.—Mr. James Forsyth, Sculptor ..... *Single-Page Ink-Photo.*
Sketches at and near Layer Marney, Essex.—By Mr. Arnold B. Mitchell ..... *Single-Page Ink-Photo.*
St. George's House, Eastcheap.—Mr. Delissa Joseph, Architect ..... *Double-Page Photo-Litho.*
Old Cottages at Alfold, Bramley, and Shamley Green.—From Sketches by Mr. Ralph Nevill, F.S.A. ..... *Two Single-Page Photo-Litho's.*

Block in Text.

Layer Marney Church, Essex ..... *Page* 42

CONTENTS.

The Society for the Protection of Ancient Buildings 37
Metropolitan Sewage 38
Notes 39
Architectural Association Visits: Layer Marney and Neighbourhood 41
The Association of Municipal and Sanitary Engineers and Surveyors.—Annual Meeting 41
The Metropolitan Board of Works Inquiry Commission.—Further Evidence 44
Notes on Sewage Purification by Electrolysis 46
Tomb of Lord Henry Marney, at Layer Marney Church 47
A Corner of Ely Cathedral 47
Monument to the Late Earl Dudley 47
Sketches at and near Layer Marney, Essex 47
St. George's House, Eastcheap 47
Old Cottage Architecture.—II. 48
Sanitary Institute of Great Britain: Annual Meeting 48
University College, London: Classes in Architecture 49
The National Registration of Plumbers 49
Archæological Societies 49
A New Form of Drain-pipe 50
Bablake Schools, Coventry 50
"Dry Rot" 50
The Student's Column: Artificial Stone.—III. 50
Recent Patents 50
Recent Sales of Property 51
Meetings 51
Technical Instruction 51
Miscellanea 51
Prices Current of Materials 52

The Society for the Protection of Ancient Buildings.

THE Annual Report of this Society commences with the usual confession, which crops up again from time to time in the course of the Report, that the Society has in a large number of cases failed to get any attention paid to its remonstrances or opinions. The reasons for this are probably threefold. In some cases there is no doubt that mistaken views or absolute indifference on the part of the custodians of ancient buildings lead to their being obstinately deaf to any suggestions from any quarter as to the value of an old building, and regarding it simply as their own property, to pull about as they please. Legally it may be so, but morally it is not; and we are as strongly of opinion as the Society can be that ancient buildings ought to be regarded by their legal owners as objects of national interest, the treatment of which should be regulated by considerations much wider than the mere question of what pleases the fancy of the present owner. But the other two causes which operate to render people indifferent or actively hostile to the interference of the Society are,—first, the utterly illogical and unreasoning manner in which the Society classes together all cases of restoration, without reference to the practical uses of the building; and, secondly, the offensive tone of superiority which characterises its remarks and criticisms, and which is as apparent as ever in this last Report. In the remarks on the case of Hucknall Torkard Church, in Nottinghamshire, it is naïvely observed that the Chancellor of the Diocese did not recognise the *locus standi* of the Society to appear in the case, and consequently gave the faculty for enlarging the church. Why should he recognise it? The Society is a self-constituted body of private persons of somewhat narrow views, very strong prejudices, and with a remarkably good opinion of themselves,* and there is no reason why they should expect that they should be recognised as a body entitled to interfere. The case of this church was that the parish voted for its enlargement, we presume for the practical reason that it was not large enough for the population, as no other reason is suggested, and no other seems probable. Whereupon the Society steps in, and endeavours to oppose the granting of the Faculty for enlargement, on the ground that Byron was buried in the chancel, and that the church stands in old Sherwood Forest, "and is connected with the Robin Hood legends still dear to Nottinghamshire people"; so that on this account the inhabitants are not to enlarge the church in which they worship. It is admitted in the Report that the tombs of the Byrons have not been disturbed, "but the tablets to some members of the family have been removed"—and lost or destroyed? Not at all:—"and refixed." The Society would apparently prefer that the parishioners should have too small a church to accommodate them, rather than that some tablets to those who are dead should be re-fixed in another situation. It is not surprising if interference in such a spirit, by a body with no official standing, should be regarded as little better than sentimental impertinence.

The real view of the Society, as it is to be gathered from their own reports, amounts in fact to this, that the historical interest in architecture is everything, the practical use and architectural design nothing; and they appear to be perfectly incapable of discriminating between cases where present needs render enlargement and repair necessary, and those in which the question is merely of the preservation of an ancient relic in which the historical interest alone need be considered. They cannot possibly see that what is right in the latter case may be wrong and even ridiculous in the former. Thus, in the case of Frithelstock Priory, in Devonshire, which is a ruin, and which Lord Clinton's agent thought it would be necessary to pull down owing to its insecure condition, the Society advised some repairs which would suffice to render the remains safe without interfering with their archæological value. This, we understand, has been done according to their programme; and here they, no doubt, were perfectly right and reasonable, and have done good service. But the Society can draw no line between this case and that of Dunblane Cathedral, for example. This is an ancient deserted cathedral still in tolerably good condition as to its main fabric, and the population of the district have conceived the nefarious idea of repairing and restoring it sufficiently to put it to its old use. They want a large church, and here is an old and grand one, with all the associations of age, ready to their hand, and only requiring to be repaired and put into condition. From the religious standpoint (with which we do not intermeddle here) it might be thought that there was something inspiriting in the idea of the old fane, long empty to the winds, once more consecrated to worship, and echoing the sound of hymns and prayers. But this is nothing to the Society; the religious uses and ends of a church are of no moment at all; it is an "ancient building," and must not be touched even to put it again to the use for which it was originally built. "A very large amount of the Committee's time has been expended upon opposing the scheme for bringing the nave again into use. . . . . It is to be hoped that next year we may be able to state that the scheme has been abandoned, and in the meantime we will ask our members to do their utmost to weaken it by stopping funds from being contributed, and in every other way which may be in their power." It is difficult to understand the existence of such æsthetic bigotry; certainly difficult to speak of it with any patience.

In the case of Acton Burnell Church, Shropshire, it would appear that "they" (a vague phrase, which seems to mean the rector and churchwardens) "seem to be disregarding the advice given in the Society's Report in every particular." Part of the work thus commented on consisted in opening an old window which had been bricked up, so that we presume this is a piece of vandalism, old bricks being in themselves precious heirlooms not to be wantonly desecrated, even when they block up a window. "The plaster is all going to be taken off the walls, but a protest has extracted a promise that the walls shall be *re-plastered*." The meaning of these sarcastic italics may not be apparent to the general reader, but the fact is that old plaster is also a sacred institution, and is not to be removed from a wall. See the changes of æsthetic fashion! Thirty years ago, the very same people who are now worshipping old plaster would, if they had happened to be born at that time instead of this, have been clamouring for the removal of all plaster from Mediæval walls. The paragraph on Barney Church, Norfolk, is amusing. It seems that the Rector of that church, which has never been "restored," endeavoured to get professional advice from the Society at the cost of paying the railway fare of their architect, the reverend gentleman shrewdly calculating that thereby he

* We do not necessarily mean this of all the members and subscribers, many of whom are moderate men enough, but of those who take the prominent part in acting for the Society.

would get an architect's advice without paying any fee for it. The Committee (very rightly) declined sending an architect down except to meet his architect, and learned that he had no intention of employing one. The Committee then wrote and urged most strongly the importance of an architect being employed, "but we fear our advice has not been followed." In this case we approve of the action of the Society, but it is not consistent with the sneers at architects which abound in other pages of the Report, and with the insinuation that architects incite people to go in for over-restoration in order that their own fees may be increased. Remarks of this kind look rather as if they were inspired by some architect who has no practice himself, and relieves his feelings by throwing stones at those who have.

The case of Heckington Church, "where everything has been done in exact contradiction to the advice which the Society always gives" (a result which the Society seems quite to enjoy publishing), is not so simple as some of the others. We have not seen the church since the later restorations here referred to, in the chancel; we have a recollection of some very bad restoration work in the nave many years ago, and of the walls being pointed with black mortar in a way that made them look as if covered with a Brobdingnagian spider's web. We should fear, from the description quoted, that the chancel must have a very South-ampton-street *cachet* about it now, knowing, as we do, the kind of "orthodox church-fitting" way in which these renovations are too often carried out. But on the question of principle, all the things that have been done are not necessarily wrong in themselves. "The sacristy has been completely restored. It consists of an upper and lower chamber. A groined roof has replaced the lath-and-plaster ceiling of the lower chamber, and upon this the new tiled floor of the upper chamber, used as the vestry, rests." The complaint of the Society, we presume, would be that the lath-and-plaster ceiling was genuine work of its date, and the new groined roof is imitation Gothic. Now if Heckington Church had fallen into such dilapidation that it had to be pulled down, or had fallen down bodily, we should be the first to protest against any idea that it could be replaced by building up a new Heckington Church in precise imitation of the old one. But when it comes to treating a small portion of an old edifice, the question of architectural consistency of design comes in. A lath-and-plaster ceiling is certainly a very mean and unsuitable feature in a mediæval church; it was very likely in a dilapidated state, and the replacing it with a feature harmonising with the style of the rest of the church is in accordance with architectural consistency. Architecture is design as well as history, a view which the Society seems to have entirely thrown overboard. In the case of another church, they more than hint that the restoration of the pinnacle terminations to a tower, which had gone, leaving only their bases, would be a mistake: the point is open to discussion, but the reasonable view appears to us to be that this was a termination necessary to complete the architectural design, and which had been removed by violence (most likely), and that to complete it afresh in harmony with the rest of the structure is a perfectly reasonable thing from an architectural point of view. In the case of Heckington, again, one of the sins has been to open a new door through the west wall, so as to give access to the vestry without passing through the church, a proceeding which, it is observed, "would not even be justified from the 'restorer's' point of view." No more it would, and that is just the reason we approve of it. It is perfectly right from an architect's point of view, as the provision for practical convenience, which is part of the architect's business. The men who built Heckington Church would have had no scruple in cutting a door anywhere in an older piece of work, if they had wanted one. The contrary idea is an absurdity such as was never heard of till the present day.

In the matter of Irthlingborough tower we are entirely of the mind that every effort should have been made to save so peculiarly picturesque and interesting a tower: but was it possible? When we saw it some years ago it was in a very dilapidated condition, propped and buttressed, and we should hesitate to accept the Society's assurance that it could have been saved. It is a melancholy loss, at all events, and we quite concur that it is no use to talk in such cases of pulling down and rebuilding a structure of that kind in order to save it. It is not the same thing when rebuilt; and the quotation from a Report written by a foreign member of the Society,—"One ill contributes to the preservation of an ancient building, beginning by demolishing it," is quite to our mind. But then the evidence of the Society is apt to be so exceedingly one-sided in these matters. In reporting on another church, they say "the new truss-timbers in the aisle roof were not necessary, the old ones being sufficiently good and available." They said the same of St. Alban's nave roof, which they had never seen, and which, in fact, was an absolute wreck. Then, "deal or pine has been mostly used for the roofs instead of oak, this treatment being contrary to the advice of the Society." Probably the restorers would have been most happy to use oak if the Society would have found the money for it.

We feel considerable sympathy with the protest made against the jamming up of Westminster Abbey with scaffolds for the Jubilee festival. It certainly involves great danger of damage to a building the interest and value of which is unique in England, and we agree entirely with the remarks in regard to the vulgar maltreatment to which the ancient Coronation chair was subjected in preparation for the same occasion. With much, also, of the special report in regard to St. Mark's, Venice, signed by Professor Middleton and Mr. Wardle, we cordially agree, especially as to the treatment of the mosaics, and the strong desire expressed that every means should be used to retain the original mosaics in their place, instead of indulging in the futile idea of reconstructing the more dilapidated portions in new material, from what is left of the old design. That is neither one thing nor another, neither old nor new. Preserve the old with every care as long as possible, and, where it is so gone that it cannot be preserved, replace it with the best modern art available, in harmony as far as may be with the old, but not in attempted imitation of it. This portion of the Report, in fact, we read with almost entire sympathy, and it is written in a far more reasonable spirit than the rest.

"The action of the Society," we are told, "has been very much hampered during the past year from want of the necessary funds for carrying out its work"; and we cannot wonder at this. The Society's own annual Reports are calculated far more to alienate than to invite the subscriptions of reasonable people among the outside public. Year after year they bring out these Reports, full of complaints (which, as before observed, they seem rather to glory in) that no one attends to them; that they cannot get their wishes carried out, and in many cases cannot even get answers to their letters; and full of indications of their own unreasonable and intolerant views and their total want of comprehension of the artistic and practical side of architectural work. If they really wish to get the confidence of the public and to encourage subscriptions in aid of their work, which is no doubt meant well, our advice to them would be to publish no more Reports. "The Protection of Ancient Buildings" is in itself a noble object, and this style and title might avail to attract the assistance and sympathy of many who would be only repelled or idly amused by the curious exhibition of feebleness, confusion of ideas, and unpractical sentimentality, which the annual Reports of the Society bring before them.

Archæological Researches in Peru.—A Peruvian journal states that a syndicate, with a capital of 8,000*l.*, has been in Peru, for the purpose of excavating the ancient burial-places at Cuzco, which are known to be rich in prehistoric remains. A concession has been obtained from the Government.

METROPOLITAN SEWAGE.

THE Reports of Sir Henry Roscoe to the Metropolitan Board of Works, which we printed last week, show that both the sewage itself and the gases and vapours which arise from it must be oxidised, and that the oxidation in both cases must be effected by atmospheric air. The contact of free oxygen with the sewage has the result of rendering the organic matter inoffensive. The bad smells along the lines of sewer proceeding to the outfall have been somewhat reduced during the last two or three years by deodorants, at a cost of 40,000*l.* a year; but it is a temporary remedy, and does not affect the nature of the sewage at the outfall, the quantity added being quite insufficient to oxidise even a small part of the putrescent matter which gives rise to the emanations. If the water of the Thames where the sewage is discharged into it were unpolluted it would contain sufficient free oxygen to render the sewage inoffensive; but it is not so, and no further amount of oxidising chemical which might be added to the sewage can restore the river water to its normal condition. This brings Sir Henry Roscoe to consider whether the end cannot be attained by the aëration of the sewage before it enters the river. The cost of pumping air through the sewage need not, he says, be considerable, and he believes that this may turn out to be a solution of the problem. At any rate, he feels sure that it is a matter well deserving of further inquiry. It certainly is, but we expect the inquiry would result in the recommendation to take the sewage to the air rather than to force air through it at Barking or Crossness. It is not the first time that it has appeared desirable to aërate sewage by bringing it into close and minute contact with air, but the difficulty of operating upon a mass of sewage in a reservoir has hitherto made it appear the better way to take the sewage further from the town, and spread it over a more extended area, either in the condition in which it arrives by the sewer, or after the coarser part of the solid matter has been removed from it; but after so long a travel as the metropolitan sewage must have, it would probably arrive at its destination in a condition to be at once run over the land. That, however, is a detail involving no difficulty. The real difficulty is in obtaining a sufficient area of land, but it need not be all in one place; there might be an abundance of suitable land within reach of the metropolitan sewage had not the absurd idea of concentration of the sewage at one spot rendered the utilising of much of this area practically impossible. To dispose of 156,800,000 galls. a day it should be divided into numerous outlets. Concentration of a large amount of work in one establishment tends to economy of working in most things, but sewage disposal is not one of them; or, at any rate, is not a suitable business for the application of that principle, although, in respect of economy of working alone, it would follow the general rule, no doubt.

But that, it need hardly be said, is not the chief consideration. The nuisance created by discharging the metropolitan sewage into the Thames at Barking and Crossness under the present conditions must evidently be made to cease, by some means; and if Sir Joseph Bazalgette can blow air through the sewage in sufficient quantity to satisfy Sir Henry Roscoe, it may answer the purpose, if the residual deoxidised air blown out will do no harm to the neighbourhood; or if,—but this is a chemical question we hardly dare touch upon,—the necessary oxygen can be previously disengaged from the air; and if so, we should suppose it would be preferable to bring it to the works from a distance; from the open country or the sea-side; and in either case the plan might be cheaper than that of taking the sewage to the land. Sir Henry Roscoe says in his "general conclusions" that, looking at the broad question of the permanent disposal of the metropolitan sewage, and believing that the use of deodorants ought to be regarded only as a temporary expedient, he feels convinced that sooner or

later the recommendations of Lord Bramwell's Commission, 10 and 13 in their Report, will have to be adopted, and that the sewage, whether previously clarified or not, must either be filtered through land or discharged into the estuary at a point not higher than Sea Reach.

The recommendations referred to are those, we suppose, of the second and final Report, viz. :—(10) "But we believe that the liquid, so separated, would not be sufficiently free from noxious matters to allow of its being discharged at the present outfalls as a permanent measure. It would require further purification ; and this, according to the present state of knowledge, can only be done effectually by its application to land" ; and (13) "If suitable land, in sufficient quantity and at reasonable cost, cannot be procured near the present outfalls, we recommend that the sewer liquid, after separation from the solids, be carried down to a lower point of the river, at least as low as Hole Haven, where it may be discharged. In this case, it will also be advisable that the liquid from the southern sewage should be taken across the river, and the whole conveyed down the northern side. It may be found that the separating process can be effected more conveniently at the new than at the present outfalls." What would be considered by Lord Bramwell's late Commission sufficiently near the present outfalls, for land upon which to dispose of the sewage, does not appear. They probably had the idea that it must lie all together, and so saw a difficulty in procuring a sufficient quantity ; or, if not altogether so, at least for each side of the river ; but we should not look at the question in that light, whether near or far from the present outfalls. The difficulty in procuring land may be greater on one side of the river than on the other, and if, on that account, crossing the river would be advisable, there would be no difficulty in it ; but whether on one or both sides of the river, the sewage should be conveyed to suitable land, though not necessarily in one area.

Whatever may be the result of these Reports, as they affect the question of treatment of the metropolitan sewage, we consider that a distinct advance has been made in the treatment of sewage generally by the recognition of an eminent chemist that sewage and atmospheric air should be brought into close and minute contact in detail ; and this is true alike of the sewage itself and the gases and vapours which arise from it. The attempts to deodorise the sewage at numerous places with manganate of soda or with chloride of lime, and so to prevent bad smells arising from the openings at the ground level, are both expensive and ineffectual. With a proper system of ventilation these would become, as they were probably intended to be originally, air inlets instead of outlets. Ventilation of the sewers is especially mentioned in the fourth paragraph of Sir Henry Roscoe's Report of the 10th June, 1887.

NOTES.

THE Standing Committee on Trade concluded the consideration of the Railway and Canal Traffic Bill on Monday last. Mr. Mundella and Mr. Chamberlain have been among the most prominent contributors to the discussions which have taken place upon this measure, and have proved that their past experience has given them a good grasp of the subject. Several useful suggestions have emanated from these gentlemen, smoothing the road where there has been a conflict of opinion. Sir Michael Hicks-Beach has also made it evident that he has studied the question to good purpose during the short period which has elapsed since the Bill was committed to his charge. Some of his proposals, however, were received with decided disfavour,—notably a clause giving the Commissioners certain powers as to fixing through rates, which was eventually withdrawn altogether. Another new clause introduced by the right hon. gentleman, limiting the damages recoverable under the Act, was ruled out of order. The important question of truck rates was raised at the sitting of the 12th inst. on the following proposal by Mr. Hunter, who has been very active on the committee throughout :—"The Commissioners may, upon the application of any person interested in any particular description of traffic, order any railway company to convey such traffic at such reasonable rate per truck per mile as the Commissioners may determine." In the discussion that followed, the general feeling appeared to be rather against the proposal ; and, seeing that the adoption of the clause would probably give rise to a lengthy debate upon the Report, it was deemed advisable for it to be withdrawn. At the last sitting of the Committee a tie took place on a division as to the adoption of a new clause for the transfer of certain business to the Railway Commission from other Courts, the clause being negatived by the casting vote of the Chairman. Sir Matthew White Ridley has proved a most capable and impartial chairman, and the Committee may be congratulated upon the result of their work. The value of the new system of delegating such business as this to Standing Committees instead of occupying the time of the whole House with it has been fully established, as Mr. W. H. Smith,—who was at one time very averse to it,—has been constrained to admit. The remaining stages of the Bill will be dealt with as rapidly as the state of Parliamentary business will allow, and it will, in all probability, become law this session.

THE important debate which took place in Committee on the Local Government Bill on Wednesday, on Mr. Channing's proposed clause for providing for a partition of rate charges between owners and occupiers of property, is gratifying in so far as it showed that there is among many members of Parliament a strong feeling in regard to the monstrous injustice inflicted on tenants of London property under the present system and under present circumstances, when immense improvements of every kind have been carried out, raising the value of property everywhere, of all which the owners will reap the benefit without having contributed a penny towards them. The majority of the speakers in the debate were of the same mind, and evidently thought the present state of things indefensible; but we are not the least surprised that the clause was negatived, nor do we regret it, for the simple reason that the subject is far too large and complicated to be dealt with by a mere addition to a Bill which is already of formidable character enough in regard to the complication of interests with which it deals, and the multifarious changes which it will bring about. The question of rating reform demands a separate Act, but the debate of Wednesday night is satisfactory as indicating what a good chance there is of passing a strong measure of reform within no very long period.

AN important deputation waited on the First Commissioner of Works on Tuesday to protest against the proposition to allot a portion of Richmond Park for the annual contests of the National Rifle Association. The principal speakers were Sir Whittaker Ellis and Mr. Burt, the latter a member of the Richmond Vestry ; the Earl of Fife also spoke in support of the protest of the residents of the neighbourhood ; and Lord Middleton, in the capacity of High Steward of Kingston. The general argument, however, amounts simply to this, that the transference to Richmond Park of what has hitherto been known as the Wimbledon Meeting would infallibly spoil the beauty of the Park, and its enjoyment by the public. It has also been suggested that the site was not a safe one for rifle-firing at long ranges, having regard to the great carrying power of the modern rifle in the case of shots which might be so wide of the mark as not to be stopped at the butts ; and we should be disposed to think this danger was by no means imaginary, though it may not be as great as some nervous people suppose. But of the substantial injury to the Park, as a beautiful pleasure-ground, which the establishment of the rifle meeting there would cause, we have not the slightest doubt, and we join most strongly in the protest against it. We say this with the greatest possible sympathy with the Rifle Association, and with the Volunteers generally, but we do not think Richmond Park is the place for them, either in their own interests or in those of the public. A letter from the Colonel of the Queen's Westminster Volunteers, in the same number of the *Times* in which the report of the deputation appears, suggests that a great step in the work of the National Rifle Association might be made if a site could be found tolerably central among the southern counties, and within convenient rail distance of London, for the establishment of a permanent camp for drill exercise and class firing, with sufficient permanent ranges for allowing of extensive practice at all times of the year. That would be a far better thing to aim at than spoiling Richmond Park by an annual meeting.

IT appears that although there is a very general opinion in the country that canals should cease to belong to railway companies, at least to the extent to which they now do, and that the new County Councils and the Corporations of large towns should take part in promoting their more extended use by the public, sufficient strength has not yet been brought into Parliament to convince the Government that an opportunity should be given to these public bodies to carry out the public desire, for Mr. P. Stanhope's motion the other day in the Standing Committee on Trade met with no support from the President of the Board of Trade, nor did the suggestion of Mr. Chamberlain that the Government should consider this important subject between now and next session meet with any response. Sir M. Hicks-Beach did indeed agree that it would be desirable that facilities should be given for using the canals more than they have been used for some years past, but he did not think it would be wise for Parliament to give Local Authorities power to undertake works beyond their own jurisdiction, forgetting, as it appears, that they already have that power for several other purposes. But, leaving this out of the question, it may be asked why, in their own jurisdiction, a Local Authority may not make a waterway as well as a roadway?

THE case of "The Edison and Swan Electric Light Company *v.* Holland and Others," on which Mr. Justice Kay gave judgment last Monday, after an exceedingly able and comprehensive summing up of the evidence, affords a practical lesson on the importance, in regard to patents and patent infringement actions, of knowing accurately what has been done by others, and of accurately and logically wording the definitions in the patent. The claim of the Edison Company was a double one ; first, for an injunction against the manufacture of the now ordinary type of incandescent light with a carbon filament as the light-giving medium ; secondly, against the use of the beautiful device known as "Chesebrough's Patent," for securing uniformity of sectional area in the carbon filament, by which the filament is actually made to automatically fill out its own deficiencies of thickness wherever such occur. In regard to this second claim, the learned Judge found for the plaintiffs, in spite of what appears a rather ingenious than ingenuous line of argument used by the defendants, who claimed that they could make their filaments of uniform section without this process, and that they only used it to reduce all their filaments to a uniform light-giving standard. As they admitted, however, that if inequalities of section did exist in their filaments they would be removed by this process, the Judge decided that they were infringing the patent, and legally we presume that he was correct. The first claim of the plaintiffs, which was dismissed by the Judge, is the one which points the moral of the case. It is extraordinary than an inventor of so much genius and insight as Mr. Edison should have apparently been so ill-informed as to what others were doing as not to have been aware that the principle and many of the details of the incandescent lamp had been worked out by others before the date of his patent, and

still more surprising that he should have had so little logic as to suppose that the manufacture of an improved and thinner filament with higher resistance should give him a right of veto over all other manufacturers of filament lamps. As Mr. Justice Kay says, his claim in effect was this:—"I have succeeded in making an electric lamp with a carbon burner, say 100th of an inch in diameter, which gives a high resistance, and I claim a monopoly of all lamps with carbon burners, but thicker than that, however made." Technically the Judge decided that the defendants had, indeed, infringed the plaintiff's patent in this case also, but that the claim of the patent was so exorbitant that it could not in justice be maintained: a judgment which may prove a valuable precedent in regard to the unreasonable demands often made by patentees, to the prejudice of real progress.

THE London School Board will probably find that they have made a mistake in the resolution which they passed last week, by 17 votes against 12, to call on their former architect, Mr. Robson, to make good the loss arising from defective foundations in the Broad-street Schools. The case is, that in April last cracks appeared in the wall of the school, which had been built under Mr. Robson's direction; and on examination by a test hole, it was found that the concrete used was very bad, in fact, hardly worth calling concrete at all, and that there was much less of it in depth than had been specified and paid for. Whereupon the Board wrote to Mr. Robson calling on him to make good the loss arising from their payment on his certificate for work which had not really been done. Mr. Robson's reply, which is printed at length in the *School Board Chronicle* for July 14, points out that from the nature of his appointment and the enormous pressure of work devolving on him, personal inspection of all buildings in progress on his part was an absolute impossibility, and that the Board themselves had recognised the fact by appointing, in addition to the Clerk of Works, an Inspector of Works, with the distinct object of relieving him from the bulk of inspection. The clerk of works, also, is the servant of the building owner and not of the architect, though the Board urge, on the other hand, that they had always accepted the clerks of works nominated by Mr. Robson. Still, the Board's Inspector, appointed especially for the purpose of personal inspection which the architect had not time to give, ought to have discovered such a fault in the work that was being done. If the case had been that of an architect in ordinary practice on his own account, it might reasonably be said that he ought to have given personal inspection to so important a matter as foundations; every architect in ordinary practice ought to do that; but Mr. Robson was in a different position. He was head of a large official staff for carrying on and looking after work which it was impossible he could look after personally in every point, and he was necessarily dependent on the *bona fides* and professional skill of his subordinates. In signing a certificate for payment on a statement that so much work had been done, he was only doing what is usual and inevitable in many other departments of business. Managers of banks, managers of companies, Cabinet Ministers, are constantly called upon to put their signatures to documents for the correctness of which they are almost entirely dependent on the good faith of their subordinates. The claim made by the Board against Mr. Robson is in this light morally absurd, and we believe they will find it is legally untenable.

THE third International Congress for the promotion of internal navigation, to be held at Frankfort-on-the-Main in August, will give full attention to the subject of connecting by water the Upper Rhine districts with the North Sea, and will also discuss the questions of internal navigation both from a practical and a theoretical point of view. The result of their deliberations will doubtless lead to considerable improvements in canal and river navigation. The canalisation of the Main from Mayence to Frankfort was accomplished at the suggestion of the commercial community of Frankfort from 1883 to 1886, and has already greatly benefited the city. By means of locks and weirs the river can be raised between Frankfort and Mayence to an average height of 6 ft. $0\frac{3}{4}$ in., thus enabling vessels of 1,000 tons, heretofore plying only on the Rhine, to take the direct route to Frankfort, and to dispense with the necessity of transhipping at the mouth of the Main goods destined for that city. In connexion with the canalisation of the Main, the municipal authorities have made such arrangements for shipping and traffic at the banks of the river as will ensure promptitude in all manipulations with reference to the loading and unloading of goods. A special safety and trading harbour was opened in 1886, and the trade of the Main has considerably extended since the opening of the canal.

THE July *Quarterly Statement* of the "Palestine Exploration Fund" commences with the sentence, "We have generally an announcement to make, but not often of so much importance as that of this day. It is the discovery of the Pool of Bethesda." This discovery, for such it certainly seems to be, is due to a German explorer, Herr C. Schick, who communicates a lengthy account of the process of the discovery, accompanied by a plan and two sections of the ground. The discovery arose in the course of a clearance of ground for a new building adjacent to the Church of St. Anne. The pool is, according to Herr Schick's plan and section, an oblong pool or cistern divided into five bays, and approached now by twenty-four steps, a number which nearly tallies with the number of twenty-three steps given in a fifteenth-century record. As Herr Schick says, the water may have been higher then, but the close coincidence in the number of steps looks as if we had found, at all events, the place accepted in Mediæval times as the Pool of Bethesda. But the situation of the Pool generally appears to agree remarkably well with Biblical indications. We must refer the reader to the *Quarterly Statement* for information in detail, but any one interested in Palestine topography will find it well worth reading. We cannot, however, understand the editorial remark under "Notes and News." After mentioning the finding of the first pool, we read:—

> "Herr Schick has found a second pool to this, forming what is called a twin pool. The interest of this discovery lies in the fact that the Pool of Bethesda had five porticos. Now the only possible way for a pool to have five porticos is to be a double or twin pool, so that there may be one portico along the wall of each side, and one for the wall of separation."

It would appear from this that the editor of the *Statement* has not looked at or does not understand the plans published in the same issue. The twin pool west of the "Bethesda" is not claimed by Herr Schick at all as part of the Bethesda, and the earlier pool, his "Bethesda," shows, according to his plan, five recesses in a row behind a colonnade, in which each column corresponds with a pier between the recesses at the back. Surely this is a sufficiently close rendering of *πέντε στοάς*. But Palestine archæologists seem to have each their own theory, and to be blind to any other.

IN a book entitled "Esquisses Archéologiques," M. Salomon Reinach, publisher, publishes reprints of a number of interesting archæological articles he has from time to time contributed to various French journals and periodicals. As many of these publications are by no means specially devoted to archæology, *e.g.*, the *République Française*, and the *Revue politique et littéraire*, the volume will be welcome to archæologists. The subject of terra cottas, to which M. Reinach has devoted so much labour, occupies of course a considerable space in the book. But other departments of Greek art are well represented. No. 3 is an article on the excavations at Susa, which, now the great Dieulafoy gallery in the Louvre is open to the public, will be read with interest. The reprint also of the monograph on "The Archaic Statues of the Acropolis" is well-timed. One essay, the last, on the "End of the Greek Empire," is published for the first time. The book contains a number of woodcuts in the text, and eight plates. It is nowise unworthy of the author of "L'Épigraphie Grecque."

AT a recent meeting of the Verein deutscher Cement-Fabrikanten, Dr. Leube, of Blaubeuren, gave a description of a bridge built of concrete, near Erbach, a station between Ulm and Friedrichshafen, from the designs of Herr Koch. An important feature in the construction of the bridge is the insertion of joints to provide against a collapse in the case of settlement. The arch has a width of 95 ft. in the clear, by a rise of 13 ft. The vault has a thickness of 1 ft. $7\frac{3}{4}$ in. at the crown, 2 ft. $3\frac{1}{2}$ in. at the commencement of the springing of the arch, and of 4 ft. 11 in. lower down. The concrete used for the arch consisted of one part Portland cement, one part sand, and three parts carefully washed and screened Danube gravel of walnut size, and was rammed down in layers of 2 ft. $7\frac{1}{2}$ in. wide. Considering the treacherous nature of the river bottom, a giving way of the foundations was apprehended from the first, and in order to guard against the effect of this, which would be disastrous to a concrete arch, asphalte sheets were inserted at the two abutments and in the crown of the arch. In this way collapsible joints, permitting of twisting motion, were provided, and it is stated that such torsion did take place after the removal of the centering, the joint in the crown being narrowed to the extent of 0·312 in., but, as might be expected, without any damage to the concrete. Of course, a so-called "concrete arch" is constructively not an arch at all, but a beam in arched form, and the insertion of the asphalte joints in this case converted it into an arch with very long voussoirs; an unscientific form of arch, but which seems to have answered practically in the present instance. A better construction would have been to have employed a larger number of concrete blocks each with its asphalte joint; but, of course, at greater expense. As it is specially mentioned that the bridge only cost 600*l.*, we may presume economy was the object of this experiment in bridge construction.

THE City Justices of Liverpool some time ago appointed a committee of their number, with Sir James Picton as Chairman, to inspect the theatres within the City, with reference to the provision for the safety of the public in case of fire or panic. The Committee have just presented their report, and it has been adopted by the magistrates, and printed. The report states that, after a thorough personal inspection of the theatres by the Committee, instructions were given to the City Surveyor and City Engineer to prepare plans of the buildings and to present separate reports and recommendations as to the alterations necessary for the public safety. These plans and reports were duly prepared, and after consideration by the Committee, were brought up at a Special Meeting of the Justices on the 21st of March last, when the Committee was re-appointed, with authority to carry out their recommendations, subject to such modifications as they might see fit to grant. The Committee have since held numerous meetings, have renewed their personal inspection of the buildings, and have held various conferences and consultations with the lessees and their architects, assisted by the City Surveyor. They report with pleasure that they found on the part of the lessees every desire to carry out faithfully the recommendations made. The leading features and objects of the alterations agreed to, and which are now being carried out, are thus summarised by them:—

> "The most important of all is protection from fire. It is an established fact that in every recorded case of fire in theatres, the origin has been on or behind the stage, but in no instance has the fire broken out in the auditorium. If, therefore, a solid wall of sufficient thickness is built, entirely separating the two portions, the few necessary openings being fitted with iron doors, the only difficulty to be dealt with is the stage opening or proscenium. The combustible curtains hitherto adopted are

dangerous in the extreme, and have led to very serious loss of life by the panics and stampedes arising from fright. Curtains of non-inflammable materials have been adopted, as at Exeter, but have failed in consequence of their flexibility and want of substance.

The Committee have had before them various designs and plans, and have inspected some which have been carried out, particularly that of the Prince of Wales's Theatre in London, which seems to comprise everything that can be desired for the public safety.

The main requirements are (1) that the material shall be incombustible, consisting in great part of iron; (2) that it shall be rigid, not liable to be deflected or bent; (3) that the means of lowering or elevating it shall be ready, simple, and easily worked.

There are several modes of carrying out this principle according to the extent of the opening and other circumstances, but all consist of double plates of iron, in one case hollow, the others filled in with silicate of cotton, which is incombustible.

Even in the present state of the theatres, if these recommendations are carried out, there could be no danger of panic, since the audience might withdraw without danger in the most leisurely manner; but, acting on the Report of the City Surveyor, a number of alterations have been suggested, of widening the exits, providing additional openings, improving the staircases, and in some cases constructing additional ones. These have been agreed to by the lessees, and are now in progress in the following theatres:—Alexandra, Court, Rotunda, Grand or Varieties, and Adelphi."

WE hear that the fee-simple of the old house, No. 20, North-street, Exeter, to the threatened fate of which we referred in the *Builder* of June 23 (page 444), has been offered for 260*l.* to the Institute of Architects, on condition of re-erecting the front somewhere else, as the removal of the house from its present site is necessary for the widening of the street. It is, of course, no part of the business of the Institute to purchase old houses, but possibly some archæologist with a little money to spare may be tempted to interfere and save this one.

UNDER the somewhat suggestive heading of "The Public Building Jobs," the New York *World* lately quoted the following from the *San Francisco Chronicle*:—"There is nothing quite so puerile, so silly, so absolutely idiotic in the whole system of Federal government and legislation as the way Congress goes about public buildings, or, indeed, any public improvement." It would seem, from this, that Offices of Works are very much alike all the world over.

CRAIG-Y-NÔS CASTLE, familiar by repute to many as the Welsh home of Madame Patti-Nicolini, is in the market. Built in the Tudor style, it is situated in Swansea Valley, about midway between Swansea and Brecknock. The pleasure-grounds, of 38 acres, descend by terraces and slopes to the River Tawe, which affords some good trout fishing. The whole property extends over 353½ acres. The Staffordshire estate of Lapley Hall was marked for sale by auction, at the Queen's Hotel, Birmingham, on Thursday last. Including the farm and some accommodation holdings, this property, intersected by the Birmingham and Liverpool Junction Canal, consists of 700 acres, yielding an income estimated at 1,000*l.* a year. The Hall, seven miles distant from Stafford, stands on the site of a Priory of monks Dominican, which is said to have been assigned (*temp.* Edward the Confessor) to Rheims Abbey, by Earl Ælfgar of Mercia. Subsequently appropriated by King Henry V. as an alien possession, it was given to the neighbouring collegiate church of St. Bartholomew at Tong, co. Salop, whereof the site and estates were granted, in 1 Edward VI., to Sir Richard Manors.

AN Architect (A.R.I.B.A.), who desires us not to mention names or places, encloses us a correspondence with a contractor who had been doing some work under him, and who, on the conclusion of the work, sent him a cheque, which was promptly returned, with the remark that the best way he could remunerate the architect would be to do his work thoroughly well, so that the client should have no reason to complain. The contractor's reply is characteristic:—

"Dear Sir,—I thank you for your letter of the — inst., and fully appreciate the spirit in which you return my little favour. Of course you know, and it is scarcely necessary for me to say, *such little recognitions are customary in the profession*, but I am perfectly satisfied you returned the cheque in the same good spirit in which it was tendered to you. I leave you to say whether the work was done in a workmanlike manner, and am myself perfectly satisfied if I have given satisfaction to all concerned.

Hoping at some future time to be favoured with your recommendations,—I am, &c., &c."

The hope ingenuously expressed at the close of the letter was, of course, the motive in sending the cheque at first; but the most interesting portion of the letter is the line we have italicised. How does it come about that any contractor can presume to say, as an excuse for such an improper proceeding as endeavouring to buy the future favour of an architect, that "such little recognitions are customary in the profession"? That it is an absolute falsehood about a large proportion of the profession we know well enough, but of how many is it true, if true at all? We cannot help suggesting that the Institute of Architects might itself with advantage have a Commission of Inquiry, if it could obtain powers to examine witnesses on oath. We might then have a chance of either proving such statements to be calumnies, or getting at the men who give cause for them.

ARCHITECTURAL ASSOCIATION VISITS:

LAYER MARNEY AND NEIGHBOURHOOD.

AN interesting day's excursion was made on Saturday last by the members of the Architectural Association to a little-known district of Essex, principally with the intention of seeing that fine example of English domestic architecture, Layer Marney Towers (illustrated and described in the *Builder*, April 3 and 10, 1886). Leaving the train at Kelvedon station, the party first visited the church at that place, under the guidance of the vicar, the Rev. G. P. Bennett. The church consists of a nave and chancel, with north and south aisles to each, and square western tower and shingle spire. The nave, the oldest portion of the church, is of Late Transitional date, the pier caps being an interesting example of the development of Early English carving. The roof is an open timber one of fourteenth-century date, with carved figures at the feet of the principals. The chancel and aisles are of Decorated character, and the north chancel aisle is of sixteenth-century work, replacing probably an earlier structure of the Decorated period, a niche from which and a two-light traceried window, shorn of its tracery and centre mullion, and utilised as a doorway, are incorporated in the later work. The arches and piers of this north chancel aisle are similar in detail to those separating the nave and aisle at Layer Marney Church. The chancel has the peculiarity of plan so frequently found in Mediæval churches, its axial line inclining northward from that of the nave. Amongst the monuments in the church are some good examples in marble of the English Renaissance, erected in memory of members of the Abdy family, Sir Thomas, who died 1679, Sir Anthony, 1704, and Thomas, son of Sir Anthony, 1684. Other features of interest in the church are the two hagioscopes through the piers north and south of the chancel arch, an ancient piscina in the south aisle wall, and a modern restoration of another in the south chancel wall. On the south nave arcade has been placed at some time a well-carved sixteenth-century shield, bearing the arms of England and France quarterly, with the label of the heir apparent. After viewing the church, the party were invited by Mr. Bennett into the vicarage, where they were shown a fine collection of old china, cabinets, and books, Dutch tiles, and a curious cast-iron panel representing the Last Supper, apparently of late sixteenth-century date, and based on the well-known picture of Leonardo da Vinci. Passing through the village (formerly known as Easterford) the fine old half-timber building of Kelvedon Old Hall, now an inn, with its well-carved beams, barge-boards, and open porch, was inspected. There is a good panelled ceiling in this house, but the visitors were not able to see it, owing to the recent death of one of the inmates.

The members then walked to Feering Church, where they were met by the vicar, the Rev. W. J. Packe, who explained the interior of the church, the chief features of interest being the pulpit, a modern piece of work with four carved panels of late sixteenth-century Italian workmanship, representing scenes from the Passion incorporated with it; the colour decoration, reproduced from the Mediæval work; and the modern choir-stalls, the carving of which has been excellently executed by the village carpenter. In the vestry are a Jacobean chest, table, and settle. The great charm of the church is the south aisle and porch, executed in red brick, with black headers in diaper, trefoiled arcaded cornice, and flint panels. An illustration of this work, by Mr. Arnold B. Mitchell, is given by us this week, but the charming colour produced by time and lichen must be seen to be appreciated. The date of the work is approximately fixed by the close correspondence of the detail with that of Layer Marney Towers and church, the arch moulds and plinth being precisely similar in section, leading us to believe that the same moulds must have been used for the brickwork in each instance. The mullions of the windows have been renewed in modern times, but the remainder of the work is original. The brick-ribbed vaulting of the porch is particularly good, and the whole work is an excellent example of English brickwork at the beginning of the sixteenth century.

Leaving Feering, the party proceeded to Messing, where lunch was provided at the Old Crown Inn, after which the church was visited. This church has recently been restored by Mr. Fred. Chancellor, and consequently looks very new, but the painted glass of the east window by Van Linge, and the well-carved Jacobean panelling in the chancel, are interesting. A three-mile walk from Messing brought the visitors to Layer Marney, where the rector, Mr. Boys, first showed them the church, with its monument of Lord Henry Marney, the builder of the Towers, that of Lord John Marney with its altar still remaining, and an earlier fifteenth-century tomb, probably that of Sir William Marney, whose will, dated 1414, directs the erection of such a tomb. The tomb of Lord Henry, of buff terra-cotta, with its arch canopy and early Renaissance detail, and the fine effigy of the baron, is naturally the greatest attraction, though that of Lord John is but little inferior. (Illustrations of the tomb, and of the leopards forming part of the "grate of wayscott" around the tomb of Lord John, are given in this number of the *Builder*; and a sketch of the church is also given, see next page). The church possesses a Perpendicular wagon-headed ceiling with modern decoration, a modern pulpit with portions of carving of Perpendicular and Jacobean date worked in, and a fairly preserved fresco of St. Christopher. The Towers were then visited, and the members entertained by the present occupiers, Mr. Charles Maclean and Mrs. Maclean. A full description of the mansion and its outbuildings is given in the *Builder* of April 3 and 10, 1886, already referred to. The terra-cotta work of Layer Marney should be compared with that of the sedilia in Wymondham Church, Norfolk.

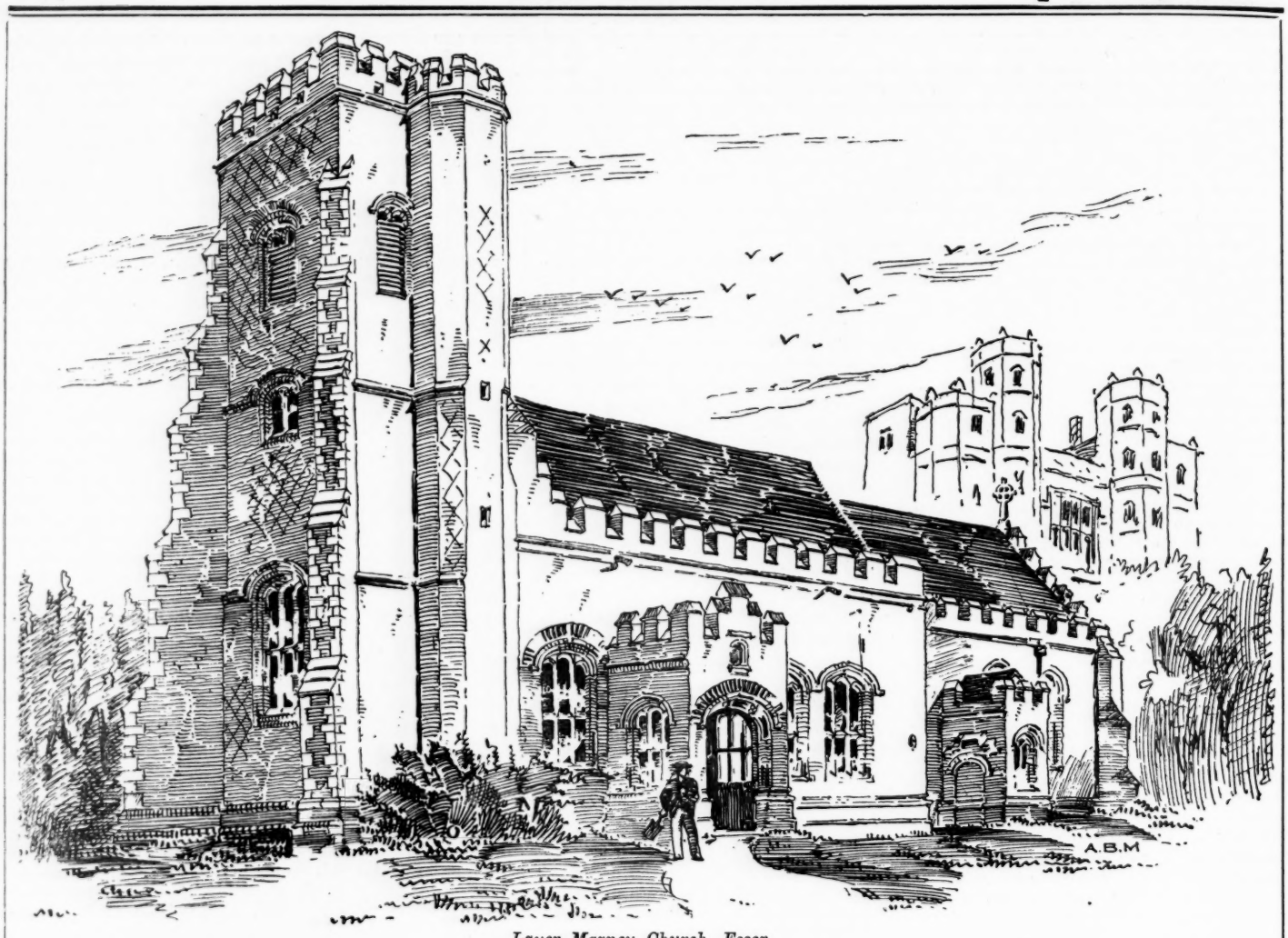
THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.—ANNUAL MEETING.

THE fifteenth annual meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held in London last week, and extended over three days. The annual business meeting was held in the hall of the Institution of Civil Engineers, Great George-street, on Thursday, the 12th inst.

The Annual Report.

The Secretary (Mr. Thomas Cole, A.I.C.E.) read the annual report, of which the following is a summary:—

The Council, in the first place, expressed their gratification at the progress which had been made by the Association during the last twelve months. During the year more new members had joined than in any previous year, the papers read had been very valuable, and the meetings generally had been numerous and instructive. During the year, District Meetings had been held at Newcastle-on-Tyne, West Bromwich, Luton, Maidstone, Lincoln, Leamington, York, and Carlisle. In all cases, the Association had been most kindly welcomed by the municipal authorities. During the financial year ending April 30th, 62 new members, consisting of 52 ordinary Members and 10 Graduates, had joined the Association. One member had resigned, and there had been one death. The numbers on the roll of the Association at the close of the period



Layer Marney Church, Essex.

mentioned were 14 Honorary Members, 320 Members, and 15 Graduates, making 349 in all. The audited Balance-sheet, which accompanied the Report, exhibited a balance in hand on April 30th of 369*l.* 1s. 7d., which, taken with the statement of assets and liabilities, showed a satisfactory financial position. The ballot-lists having been duly issued, the scrutineers had reported the following gentlemen duly elected as the Council for the ensuing year:—

President.—Mr. E. B. Ellice-Clark, M. Inst. C.E.

Vice-Presidents.—H. P. Boulnois (Portsmouth), A. M. Fowler (Stockport), and A. W. Parry (Reading).

Ordinary Members of Council.—A. Brown (Nottingham), J. Cartwright (Bury), J. H. Cox (Bradford), C. Dunscombe (Liverpool), J. T. Eayrs (West Bromwich), E. R. S. Escott (Halifax), T. Hewson (Leeds), J. B. McCallum (Blackburn), H. U. McKie (Carlisle), T. de Courcy Meade (Hornsey), R. Read (Gloucester), and T. Walker (Croydon).

Honorary Treasurer.—Mr. Lewis Angell (West Ham).

Honorary Secretary.—Mr. C. Jones (Ealing).

Two examinations had been held during the year, the first of which took place on the 7th and 8th of October, at the Town Hall, Manchester; and the second on the 27th and 28th of April, at the Institution of Civil Engineers, Westminster. At the first of these examinations, nine candidates presented themselves, and six passed.* At the second examination, twenty-three candidates came forward, and fourteen satisfied the examiners.† In view of the comparative numbers of candidates appearing in London and the provinces, the Council has decided to hold the examinations in London in future.

The Council could not allow their Report to go forth without calling attention to the fact, that one to whom they had been in the habit of looking as their leader in the sanitary world, and who had for so many years occupied the position of Chief Engineer to the Local Government Board, had retired from that honourable position, followed by the best wishes and kindly esteem of all who knew him. In tendering to Sir Robert Rawlinson their best thanks for the services he had rendered to municipal and sanitary engineering, the Council could not but express their hope that he might long be spared to meet them and still aid them by his counsel and support.

The Council had had under consideration the duties of surveyors in carrying out the terms of their appointments in connexion with the Acts of Parliament in that behalf, and had memorialised the Local Government Board thereon.

During the present session of Parliament a Bill was introduced having for its objects the compulsory registration of Engineers, Surveyors, and Architects. The Bill was fully considered by the Parliamentary Committee of the Association, who came to the conclusion that its provisions were crude and unworkable, and that the Bill would have perpetuated the very evils it sought to remedy. The Council, therefore, petitioned against the Bill, which course was also adopted by other societies representing the professions concerned, and the Bill was withdrawn on the second reading.

The provisions of the Local Government Bill, now before the House, were being carefully watched by the Parliamentary Committee.

Since the last general meeting, the Council had to report, with regret, the loss by death of two members, Mr. S. F. Rowley, of Tipton, and Mr. T. Coulthurst, of Derby; the last-named was for several years a member of the Council.

The Report was unanimously adopted.

The President's Address.

Mr. E. B. Ellice-Clark, M.Inst.C.E., President, then delivered his address, as follows:—

Gentlemen,—I have much pleasure in welcoming you to Westminster, and in congratulating the Association on its increased prosperity and usefulness. As you have heard in the annual report, there has been a greater increase in the number of members during the past year than in any year since the formation of the Association. In this connexion it is to be remarked that there has been a considerable addition to the Association through the metropolitan Surveyors, who, under the original rules, were debarred from membership. It had long been obvious to your executive that any association professing to represent the Municipal Engineering profession of this country was incomplete without including the surveyors of the greatest city of the world. There is no doubt in my mind that the Association will not only be greatly strengthened in numbers, but that the reports of its proceedings will be much enhanced, from a professional point of view, by the accession of the metropolitan Surveyors.

The sphere of usefulness of the Association is being considerably extended, not only in the papers that are contributed, and which are sought for by municipal and sanitary engineers throughout the world, but also by the work which the Council have undertaken in the examination of candidates as to their qualifications to fill the office of Municipal Engineer and Town Surveyor. The rise and progress of the municipal and sanitary engineer will some day form a very interesting history in the archives of municipal authorities; his growth from the "mere mender of roads" and the "patcher of highways" to a skilled, thoughtful, and scientific engineer, has occupied a period of about fifty years only; modern requirements are such that not only in every town in the country, but in almost every village, it is necessary to have recourse to the services of a thoroughly qualified and capable engineer and surveyor. It is a mistaken notion on the part of local authorities that, because the population whose public affairs they administrate happens to be small, the works which are required to be carried out in such districts are of a simple character. It not unfrequently happens that the engineering works necessary in small towns require greater engineering skill than they do in some of the great towns of the country, for the physical conditions of such small towns determine to a great extent the nature and cost of the sanitary works required; therefore it is of the highest importance for the conservation of the public health in those communities that all public works should be designed and executed in as careful and complete a manner as possible. This can only be attained by appointing to the office of Surveyor a man who has received a good technical education, and such appointment should be the stepping-stone to those of the larger towns. None of the work, therefore, which has been undertaken by this Association is of greater utility to the community than the examination of young engineers. Nor can the Council more fully carry out the objects of the founders than by ascertaining that all candidates for the office are possessed of the necessary professional knowledge; and when the municipalities of the country are made acquainted with the practical nature of the examinations, they should gladly avail themselves of the services thus rendered, as it will save consulting committees a large amount of labour; and, if I may be permitted to say so, the work of ascertaining the professional qualifications of candidates is better done by a body of examiners formed of municipal engineers than by the lay committee of a Town Council. These examinations are already beginning to

* For their names, see *Builder*, Oct. 29, 1887, p. 620.
† See *Builder*, May 19, 1888, p. 358.

bear good fruit, for there are not wanting instances in which the selection of a candidate for a municipal office has been determined by the holding of one of this Association's certificates. But great as is this step in advance, and largely as this work assists "the general promotion of the objects of sanitary science," if we are to carry out to their consummation the intentions of the founders of this Association we must go still a step further. It is a matter of primary importance, not only to the advancement of sanitary science, but to the community at large, what manner of men in succeeding generations shall fill your offices. We must not be satisfied with merely examining such candidates as promiscuously present themselves to us, but we must assist in obtaining the proper candidates; we should, as far as is practicable, lay down some guiding rules for their education.

It has long been evident that the present system, or rather want of system, in the training of municipal engineers in this country is exceedingly defective. On the Continent it is usual for all engineers to receive a professional education at a technical school. In England, as you are aware, the system of pupilage obtains. It is doubtful whether the Continental system is a successful one; on the other hand, the hap-hazard way in which young engineers are trained in this country leaves no doubt that there is great room for improvement; probably a combination of the two systems would bring about better results than either the existing Continental or English practice. A youth who is intended to follow the profession of a municipal engineer should receive a sound general education at some public school, and without making invidious distinctions, I would point out the Bedford Modern School as the type of academy in which he should be educated. Special attention should be paid to the acquirement of a knowledge of physics, higher mathematics, free-hand drawing, and chemistry; and he should, if possible, master at least two modern foreign languages, preferably French and German. At about the age of seventeen he should be sent to a School of Municipal Engineering, if such could be found, and it may be here pointed out that there is no practical difficulty in the way of establishing such a school. There might, at the Crystal Palace School of Engineering, Owens College, Manchester, Mason's College, Birmingham, and other similar Colleges, be special courses instituted for the technical education of municipal engineers. Here should be taught the elements of surveying, the use of instruments, practical mechanics and mechanical drawing, and the strength of materials; other subjects will occur to you, but these appear to me to be the leading subjects in which the knowledge of pupils entering engineers' offices is most defective. A year, or three terms, passed at such a technical school would be invaluable, so that when a pupil entered a muncipal engineering office, instead of being of no service for from six to twelve months, he should be useful at once. The period of pupilage should be at least four years; three years is altogether inadequate in which to acquire a sufficient knowledge of the profession to enable him to become a competent assistant on completing his articles. As the practice of our profession varies very considerably in different localities, the exchange of pupils by municipal engineers would be most advantageous; say, for instance, if a pupil articled to the Borough Engineer of Leeds could be transferred for the last year of his articles to London, and *vice versâ*, his experience would be greatly enhanced, and probably the employers would also be benefited by such an exchange of pupils. Each engineer will know best how to treat each pupil. It is usual for him now to commence in the drawing-office, and in a couple of years to go out on to works. It is doubtful if this is the best plan; a knowledge of practical work goes a great way to make a good draughtsman, for the simple reason that if a man knows what he is drawing he is much more likely to become an accomplished draughtsman than by copying drawings which to him are mere lines and colours. Perhaps the first year of pupilage should be spent out upon works. During this year the not unimportant portion of his future occupation, viz., the ordinary maintenance of roads, sewers, and buildings, should not be neglected, for it is not an uncommon thing for a young surveyor, who has never previously superintended the paving of a street or had any experience in the handling of workmen, to receive an independent appointment. The third year, after spending one year in the office, should be devoted to engineering works of as diverse a character as the district will afford. In the last year the pupil should be engaged on both office work and out-of-doors, assisting in the preparation of schemes and seeing them executed. At about the age of twenty-two, such a young man would, with ordinary ability, be worth taking into an office at a salary, and he should be well able to pass the examination of this Association. A considerable number of candidates have presented themselves for examination, and their numbers appear to be on the increase.

It will be asked if, after all the preparation described, and a young man becomes a competent municipal engineer, is there a good prospect open to him? It is a common cry with the young men of the age, that all the professions are overcrowded. All walks in life are overcrowded with incompetent men. No profession, especially our own, is overcrowded with thoroughly competent and trustworthy men. Of the amount of work that yet remains to be done by the municipal engineer, it may be stated that during the past few years I have had, as consulting engineer, through my hands, reports on upwards of 1,000 houses in the metropolitan area, the rateable value of such houses averaging considerably more than £100 per annum. Of these, 50 per cent. were in such a bad condition as to require entirely new sanitary arrangements. Now, the number of houses in the metropolitan area may be roughly taken at 750,000. If the above figures offer a true indication of the present condition of these houses, there remain something like 375,000 in London alone in which new drainage works are absolutely necessary; and, looking at the high rateable value of the houses of which mention is made, it is probable that more than this number require to have their sanitary appliances renewed. This condition of things probably obtains in a greater degree in the provincial towns.

This is only one part of the work which the future municipal engineer will have to accomplish. There is much to be done in the arterial drainage of towns, and also in the prevention of floods in the great river valleys of this country, and in discovering, inventing, or designing an economical pavement, which must be impervious, insonorous, durable, and non-slippery. The municipal engineer has given to the larger populations during the past forty years good water supplies, better drainage, and better-paved streets, and has also instituted some systems for the removal of decaying matters accumulating round dwellings more or less successful, but there still remains other work for him to execute. Before the sanitary condition of our towns is anything like perfect, we must do something more than prevent air pollution from decaying matters. The salubrity of a town, though depending very much upon the foregoing, is still incomplete while air pollution by smoke takes place as it does at present. You have lately been discussing the question of the merits of the so-called "Destructors." No doubt the economical and speedy removal of house refuse requires a practical solution, and it may be that the so-called "Destructor" is, for the moment, the most ready and practical means available for accomplishing this object; but it certainly is, as its name indicates, a barbarous and unscientific system.

Owing to the cheapness and availability of fuel in this country, we pursue a method of obtaining heat in dwelling-houses which is only one step removed from the consumption of fuel on an open hearth in the tent of the savage, and the same unscientific method of obtaining heat prevails (only in a lesser degree) in nearly all the factories of this country. By the imperfect and partial combustion of fuel in an open fireplace, we not only do not obtain one half of the effective value of the fuel, but we pollute the atmosphere to such a degree as to make the air of most of our cities, through a considerable portion of the year, almost insupportable. Let us conceive for one moment what a beautiful city London would be, even in winter, without the well-known London fogs, which are largely due to the presence of unconsumed carbon, caused by smoke from domestic fireplaces. Take again the Lancashire towns, from Manchester to Preston, through Darwen and Blackburn. These towns are physically situated in a series of the most beautiful valleys in England, and if they were freed from smoke, their natural position would certainly render them desirable places of residence, which cannot be said under their present condition.

The future municipal engineer must, therefore, among other things, pay attention to the prevention of air pollution by smoke. Many attempts, as you well know, have been made during the last half-century to accomplish this object, and a few years ago an exhibition was held in London for the purpose of demonstrating that such pollution can be prevented. No doubt considerable advances have been made in this direction, but in my judgment any attempt to overcome the difficulty by burning fuel in an open stove will end in failure. We are nearer a solution of this subject than is generally supposed. The manufacture and distribution of non-luminous gaseous fuel for heating purposes from a central station is not very far distant; by this means you will not only prevent air pollution by smoke, but you will be able in a very large degree to overcome the difficulty of removing decaying matter not passed into the sewers. If such a system were at work in town there would of course be few or no cinders or ashes to be removed from houses, and there should be no difficulty in designing such a stove, fed by gaseous fuel, as would, in every house, consume the decaying matters which now form so large a bulk of "house refuse."

There is another subject to which I am desirous of drawing your attention, and that is, to the great waste of money and time which takes place in the present method of arriving at conclusions in respect to many of the problems which a municipal engineer has to solve. Now, while I deprecate to a great extent the interference of the State in commerce and manufactures, as well as in many municipal affairs, it appears to me that great benefit would accrue if assistance were given by the State, or if, by a combination of the Municipal Authorities of this country, there could be established some kind of Institute or permanent Commission for original scientific research. What enormous sums of money would have been saved had the disposal of sewage been taken in hand by such a Commission or been worked out by practical and scientific men, keeping accurate records and making original observations at some sewage-works, as well as in the laboratary, making public reports of their observations and experiments from time to time! If there had existed such a body as this in those days when Mr. Wicksteed was laying the first sewers at Leicester, and Mr. Pilbrow was doing like work at Tottenham, now thirty-six years ago, the solution of the problem would have been greatly expedited. A large mass of information on this subject exists, buried in Blue Books and Reports to Sanitary Authorities, and therefore not available for practical purposes. It is well worth the consideration of any Government of a State like ours, where large masses of population are aggregated together, and with this aggregation still going on at an almost alarming rate, whether some of the more difficult problems which are now attempted to be solved by individual municipalities and engineers should not be grappled with by a State College or a Commission such as I have named.

It is now more than a year since a Committee was appointed by your Council to collect information and report upon the question of the ventilation of sewers. The mass of evidence which has poured in upon them is such as will require an amount of work which it is well-nigh impossible for that Committee to undertake; and I shall be disclosing no secret by saying that the publication of that report may be delayed a considerable time, probably years, because of the inability of the members of the Committee to give that time and attention to the work which are necessary. If there were in existence a Commission of Experts something on the same lines as the "German Commission of Experts for the Consideration of Patents," the evidence collected could be placed in their hands, work would be expedited, and a valuable report prepared in a few months which will now probably take years to accomplish. In the same way, a great number of subjects might be dealt with, and it is for you and your immediate successors to ponder well on the establishment of such a Commission as I have described.

Coming to topics which may more particularly

interest members of this Association, the past year has been a most important one in two respects. This year has seen the proposal for a large measure of local government which may have considerable influence on the future of the municipal engineer and local surveyor. Without trespassing on the domain of politics, I may confess my disappointment at the scope of the Local Government Bill. With the question of taxation and representation going hand in hand we have nothing to do, but it was greatly hoped that we should see in the Local Government Bill such a readjustment of the sanitary areas of this country as the exigencies of the case demand. It is well known that the administration of the sanitary laws is much more effective and much more economical in larger areas than it is in the small ones; the reasons are very obvious. As a rule, local government in the smaller areas is left in the hands of those who do not best serve the public interests, while the administration in the larger cities is very much more complete in every respect; therefore no Bill for the local government of the country can be considered anything like perfect without a readjustment of the areas. I understand it is very unlikely that the Report of the Boundary Commissioners will have any effect. It appears that so many interests have been touched, so many boundaries had, in justice, to be readjusted, that opposition has been excited from all quarters; but, however that may be, we cannot shut our eyes to the fact that sanitary work and sanitary administration suffer very largely from the present distribution of the areas; and no measure on this subject will, in my judgment, be complete until all the local authorities having administration over towns of less than 10,000 inhabitants are merged into larger communities; but I am afraid this is not likely to take place in our generation, and it is very difficult to make any practical suggestion that will better the state of affairs.

Another subject which greatly interests municipal engineers is the case of Whiteley *v.* Barley. It is not necessary to enter into all the details of this case; it is sufficient to say that a surveyor, acting under the distinct resolutions and by the authority of a Corporation, has been mulcted in heavy penalties under the 193rd section of the Public Health Act, which was never meant to cover such cases as this. It appears now, from the decision of Mr. Justice Mathew (which has been upheld under appeal), that no engineer or surveyor of a Local Authority may receive any other emolument but that of his salary. It seems to me that this was never intended by the Legislature at the time the Public Health Act was passed, and that it is directly in opposition to the interests of the ratepayers at large. The engineer or surveyor is appointed by a Sanitary Authority, at such a salary as is adequate for the ordinary work of a town; but there occurs, from time to time, a necessity for engineering works which demand a skill and a knowledge that should be paid for, and that is paid for in other branches of our profession on a much more remunerative scale than the salaries of local surveyors; and it is positive economy on the part of the authorities to pay their local engineers and surveyors a moderate salary for ordinary work, and extra remuneration for such additional work as crops up from time to time. It was the custom within a few years to employ an independent engineer to carry out most of such works; but the standard of knowledge and skill of the municipal engineer has so largely increased during the last quarter of a century that the custom of employing independent engineers is now falling into desuetude; and, I think, the change on the whole is a good one, and advantageous to the community, for however good he may be, no independent engineer can have such a complete knowledge of the requirements of communities as those officials who spend the whole of their time amongst them; and, therefore, even if the local official were paid for such extra work the full percentage that would be paid to an independent engineer, it would, in my opinion, be both economical and advantageous to the community that he serves. Whenever any alterations are made to the Public Health Act this is a matter that must not be lost sight of.*

A vote of thanks having been accorded to the President for his address, the following papers (to which we will return) were read and discussed, viz., on "Back streets, Lanes, and Alleys," by Mr. H. U. McKie, City Surveyor, Carlisle; and on "The Average Meter System," by Mr. G. R. Strachan, Surveyor to the Vestry of Chelsea.

Subsequently, the new drainage works on the "Shone System" at the Houses of Parliament* were inspected.

In the evening the annual dinner of the Association was held in the Victoria Hall of the Criterion Restaurant, the President in the chair, supported by Sir Robert Rawlinson, Sir Joseph Fayrer, Dr. B. W. Richardson, F.R.S., Major Tulloch (Engineering Inspector, Local Government Board), the Mayor of Leamington, the Master of the Plumbers' Company, and a large number of members and friends of the Association.

On Friday, the 13th inst., the second day of the meeting, after breakfast at the Hôtel Métropole, an interesting visit was paid to Messrs. Jennings's sanitary works at Stangate, Lambeth. Subsequently, a meeting was held in the hall of the Institution of Civil Engineers, when a paper by Lieut.-Colonel Jones, V.C., entitled "Ten Years' experience of the Shone System" was read and very critically discussed. To this and to other proceedings of the day we will return. Papers were also read by Mr. T. de Courcy Meade, Surveyor to the Hornsey Local Board, on "Electric Fire Alarms," and by Mr. W. Webster, F.C.S., on "The Purification of Sewage by Electricity." The last-named paper, which is one of some interest and importance, will be found on another page. After partaking of luncheon at the Hôtel Windsor, Victoria-street, visits were paid to the Lucigen Light Works and Brin's Oxygen Works, Westminster, and to the New Battersea Bridge Works, of all of which more hereafter.

The concluding day of the meeting was devoted to a trip down the river in the steamer *Cupid*, kindly provided by the President. The members landed at Greenwich to inspect the works of the new Greenwich Ferry, which were described by Mr. J. Standfield, M.Inst.C.E. We will say something about this Ferry (which is fast approaching completion) on a future occasion. Embarking once more, the members proceeded to the contractors' jetty at Barking Creek, to inspect the new precipitation tanks and sludge stores now nearing completion at the Northern Outfall sewage works, from the designs of Sir Joseph Bazalgette, in whose absence the visitors were conducted over the works by Mr. Marshall, the assistant engineer. Messrs. John Mowlem & Co. are the contractors, and the excellent character of their work called forth general expressions of admiration from the critics and experts assembled, though the question whether the new works were likely to answer the anticipations of their engineer was one as to which there was much dubiety. Before the visitors left their seats at the luncheon-tables, and prior to the inspection of the works, Mr. Thomas Cole, the Secretary, read a description of the general scheme, furnished by Sir Joseph Bazalgette. This is in type, but is necessarily held over until next week. Returning to London, the members parted company for return to their several destinations, mutually congratulating each other on the great success of the three days' meeting, which has been more numerously attended, especially on the last two days, than any previous annual meeting. We hope next week to devote further space to a record of its proceedings.

Present of Free Library Buildings to Camberwell.—Mr. George Livesey, C.E., the Chairman of the South Metropolitan Gas Company, has offered to erect and present to the Camberwell Vestry free library buildings in the Old Kent-road, the offer being conditional upon the Vestry maintaining the efficiency of the building when completed. The offer has been readily accepted, and the Vestry have decided upon making an appeal to the public for subscriptions in order to provide three additional libraries in different parts of the parish, steps to be taken in the meantime to put the Libraries Act into force in the district. The Library rate is not to exceed one halfpenny in the pound.

THE METROPOLITAN BOARD OF WORKS INQUIRY COMMISSION.

FURTHER EVIDENCE.

WE resume our summary* of some of the more salient parts of the evidence given before the Royal Commission of Inquiry into the working of the Metropolitan Board of Works.

At the sitting held on the 3rd inst., Mr. Charles Dunch, architect, recalled, said he had acted for claimants against the Board on many occasions, but had never on behalf of such claimants or in any other way had any pecuniary transactions with Goddard (senior). His fees were always paid direct to him by the Board, and he allowed no part of his fees to any one. So far as regarded the site of and the pulling down of the old Pavilion and the erection of the new one, he had nothing whatever to do with it, directly or indirectly. One or two members of the Board (Mr. Cook, for instance) were his clients, but for business not in any way connected, directly or indirectly, with the Board or with Board sites.

Mr. Felix William Spiers said he was chairman of Spiers & Pond, Limited. With his late partner, Mr. Pond, he was formerly the proprietor of the Criterion Theatre, which was first opened, he thought, in the year 1873. In May, 1877, a Select Committee of the House of Commons sat and examined witnesses respecting the construction and safety (in case of fire or panic) of the metropolitan theatres. Before that committee, the Deputy Chamberlain, Sir Spencer Ponsonby Fane, testified that with reference to safety and ventilation, the Criterion was one of the best theatres in London. In September, 1882, on receiving notice to take up the renewal of the license, the Lord Chamberlain informed them that the license would be a provisional one pending the report of the Metropolitan Board of Works, and would expire on Dec. 30. A report had then been made by Captain Shaw to the Board of Works on the condition of all the theatres of the metropolis. In October, 1882, witness's architect wrote by his direction to say that he was prepared to carry out all the recommendations of Captain Shaw. Ultimately, finding that the Board had stated that the construction and position of the building was such that no structural alterations could be suggested which would effectually provide for safety in the event of an outbreak of fire, and that, therefore, it was unfit to be used as a theatre, witness put the matter into the hands of Messrs. Haines, and agreed to pay them 1,000 guineas if they succeeded in obtaining the license, and 500*l.* if they did not. On the 23rd of February, 1883, he paid 250 guineas for extra expenses and outlay. Mr. Haines had a free hand to spend whatever money he liked, and no doubt he paid the hundred guineas each to Mr. Saunders and Mr. Fowler, and the 50*l.* to Goddard, and informed him (witness) at the time. Examined by Mr. Winch, Q.C., on behalf of the Inquiry Committee, witness said there were certain members of the Board with whom his company had done business, but only to a slight extent. Mr. Saunders was appointed by witness's company as joint-architect with Mr. Verity in respect of the "Cock" Tavern,† and the joint architects received a cheque for 1,300*l.* Asked whether Mr. Saunders's appointment as joint architect was not for the purpose of rewarding him for his services in connexion with the Criterion Theatre, witness said "You may put it in that way."

Mr. Joshua Ellis, Secretary to Spiers & Pond, deposed that in June, 1883, he gave 10*l.* to Mr. Haines, who handed it to Mr. Lancaster, a clerk in the Board's office. That sum was given, he thought, after the plans had been passed, and was merely a recompense for the politeness with which Mr. Lancaster behaved to Mr. Haines.

Mr. Charles Bowyer said he was the owner of a property situate at Goldhawk-road, Hammersmith. In 1886, Mr. Schneider, an architect employed by him, made an application to the Board for permission to erect one-story buildings (shops) on a portion of the forecourt of four houses there. The application was refused. The footpath that would have been left had these shops been erected had an average width of 13 ft. 6 in. Witness felt that the refusal of his application was most unfair, as permission to build out had been given to owners in

* For an article commenting on the case of Whiteley *v.* Barley, see the *Builder* for Dec. 10th, 1887, p. 795. For a report of the case on appeal, see *Builder*, June 9 last, p. 417.

* Fully described in the *Builder* at the time of their completion. See No. for Jan. 29, 1887, pp. 178, 179; and No. for May 14, 1887, p. 733.

* See *Builder*, current vol., p. 8, *ante;* and last vol., pp. 434, 446, 466.

† See summary of Mr. Verity's evidence, *Builder*, p. 8, *ante*.

Uxbridge-road and in The Grove, Hammersmith. He also complained of the long delays that occurred in getting answers from the Board.

Mr. Ernest Schneider, an architect, said that he remembered making an application to the Board on behalf of Mr. Roberts to build forward on some land he owned in The Grove, Hammersmith. (He was Mr. Roberts's assistant at that time.) The application was refused, and Mr. Roberts afterwards granted a lease of the plots of land in question to Mr. Bartley, a coal merchant. Mr. Bartley was ultimately allowed to build forward. He believed that Mr. Millwood, one of the Board's servants, was employed by Mr. Bartley as architect and surveyor.

Mr. Alfred Millwood, recalled, said he was in the Architect's Department of the Board. He had acted for a few persons who were erecting or were about to erect buildings, by making plans for them, in his own time. He believed that in some instances those plans were submitted to the Board. He made a plan for Mr. Bartley for building out in The Grove, Hammersmith. Knew that the Board had previously refused to allow the buildings to be brought out, but the plan he prepared for Mr. Bartley was for one-story shops only. Witness believed he was in the Building Act Department of the Architect's Office at that time, but he had nothing to do with determining questions as to the allowance or disallowance of plans. Practically that rested with Mr. Hebb, or with a temporary assistant (Mr. Collard) employed at that time. Witness did not speak to any one in the office as to the plan he prepared for Mr. Bartley; Mr. Hebb dealt with it: he, witness, had not the slightest influence in the matter. Mr. Bartley was an old friend of witness's, and he came to witness's house and asked him to make the plan.

Mr. Bowyer, recalled, pointed out that in the application which was allowed for building out in The Grove, Hammersmith, the footpath was much narrower than the footpath would have been if his application *in re* Goldhawk-road had been granted. If he had employed Mr. Millwood to make his plan, he thought he should have succeeded in his application.

Mr. William Bradly said he was in the employment of the Metropolitan Board of Works, and had been in the Improvements, Compensation, and Estates Department since 1878. Mr. Goddard (sen.) was his immediate chief. He prepared details for valuations, which were submitted to Goddard, who settled the amount which the Board was to give for any property. In two instances witness had received money in connexion with properties that had been purchased by the Board. He (witness) and his friend, Mr. Frank Hards, of Greenwich (who was his fellow-clerk for ten years before witness entered the Board's service), had had "various little speculations" together for a long series of years, and they were jointly interested in some property (at Europa-place, Battersea) which had been scheduled by the Board. Originally, a letter was sent by the owner of the property offering to negotiate with the Board, but the Board declined to take action in the matter. Mr. Frank Hards negotiated with the owner, but witness could not say how Hards first got his information as to the property,—whether from witness or from the advertisement in the paper. The property was subsequently offered by auction, and they (witness and Hards) bought it. He believed they gave something between 400*l.* and 500*l.* for it. Afterwards the Board obtained compulsory powers, and in about the middle of 1885 they gave notice to treat. That notice was served on "the purchaser, a Mr. Thomson." In explanation of this statement, witness said that Mr. Hards and himself "thought it better, so that Mr. Goddard should approach the matter perfectly unbiassed, that another name should appear," so that Thomson, while he appeared to be the owner, was really representing witness and Hards. There was a conveyance of the property to Thomson. The Board paid 700*l.* for the property. Witness's valuation was 660*l.* Goddard saw the property himself, and increased the valuation to 700*l.* Witness had had no financial transactions with Goddard beyond receiving from him a sum of 31*l.* 4s. 10d. for assistance with reference to some railway matters referred to him as umpire, and smaller amounts, perhaps 10*l.* in all, for charities, &c.; the whole of those payments did not exceed 45*l.*, and not one penny of that sum had any connexion with Board matters. The profit made on the Europa-place transaction was about 240*l.* Witness received 124*l.* as his share of the profit. Witness and Hards bought another property at Hughes's Fields, Deptford, in precisely the same way as had been described in regard to the Europa-place property. The Deptford property was put up to auction on Nov. 28, 1884, and witness and Hards bought it for from 1,400*l.* to 1,500*l.* He could not say the exact amount. They knew that this property was likely to be required by the Board. A Mr. Francis was the nominal buyer in this case, not Mr. Thomson. The last-named was a pupil of Mr. Hards, or, rather, of the old firm of Hards, Vaughan, & Jenkinson. He was a pupil of the old firm before Mr. Frank Hards was connected with the business at all. Witness valued the Hughes's Fields property at 2,800*l.*, which was at the rate of 2d. a foot, other properties quite near to it being absolutely leased at a rate that would bear out that value. Mr. Goddard valued the property at 3,000*l.*, and the Board gave that amount for it. Witness's profit on that transaction was 500*l.*, but that was not half the profit. Mr. Hards had all the rest, because "he financed the whole matter," while witness put no money into it. It was about two years and a half after the sale by auction that the valuation was made by witness and Mr. Goddard. The amount of "Mr. Francis's" claim was 4,300*l.* From the first, witness's opinion was that the value of land was 2d. a foot, so that the claim sent in in the name of Francis, but really on behalf of witness and Hards, was for a very great deal more than the property was worth; but in explanation of this, witness said he wished Mr. Goddard to approach the matter perfectly unbiassed; he wanted it to go before Goddard as any other claim would go. He never made the slightest suggestion to Goddard on the subject. He knew of no other instances in which property which was known to be required by the Board had been bought up or speculated upon in this way. Examined by Mr. Bosanquet, witness said he did not assist Francis to draw up his claim. He did not give a receipt for the 500*l.* to Hards, nor did he find any money for the first-named transaction (Europa-place), although in that case he believed he received half the profits. Although he put in no money, it was a joint speculation. He assumed that he used his knowledge that the property had been offered to the Board. Examined by the Chairman, witness said that he knew the Board were pretty sure to take the property when they obtained the Parliamentary powers they were then seeking; but he was also quite sure that the Board would pay 700*l.* to anybody else. He could not influence Mr. Goddard's mind one sixpence. Did not know of any other official or member of the Board who had purchased property that had been scheduled by the Board. Cross-examined by Mr. Winch, witness said he was appointed "assistant-valuer" of the Board in 1885. Could not give any particular names that turned up often as claimants against the Board, except perhaps "Smith," "Brown," "Jones," and "Robinson"; but certain uncommon names had not appeared to his knowledge frequently. In June, 1886, witness purchased a ground-rent of 50*l.* per annum, secured on property at Greenwich. He sold it to the purchaser of the leasehold interest in 1887. The property had been scheduled by the Board in connexion with the approach to a tunnel they were seeking for powers to make under the river, but at the time he purchased it no proposal affecting the property was before the Board, and at the time he sold it the Bill for the tunnel had only passed its second reading. Since that time he had not had one sixpence interest in the property, which had not yet been taken by the Board. So scrupulous had he been in this matter that he would not deal with it at all, and on his suggestion, an outside valuer, Mr. Robert Vigers, had been consulted, and had fixed the value of the property. Asked why he had adopted a different course in this transaction to that pursued in the other two, witness said it was "because Mr. Goddard had talked about his retirement for some time, and he thought, perhaps, that that might make him the responsible officer for valuations." Questioned by the Chairman, witness said he meant by this to say that in that event he would have been at the head of the office, and the person to decide on the valuation, for he thought there was a great difference between the head of the department responsible for the valuation, and a subordinate. Did not contemplate the eventuality of Mr. Goddard's retirement at the time the Europa-place and Deptford matters were going forward, although it was "in the dim distance." In answer to Mr. Winch, witness said his salary at the Board was new 350*l.*

Mr. Thomas Blashill, the present Superintending Architect to the Board, recalled, produced the plans and the documents in regard to Mr. Bowyer's line of frontage case, which came before the late Mr. Vulliamy in the first instance. The witness described the usual procedure in such cases. When an application of the kind came in, the following was the course pursued:—The two parties on each side of the premises in question were written to at once from his (witness's) department. A fortnight was allowed for a reply. The Vestry in whose district the case occurred was also written to, and if within a fortnight no reply was received, it was concluded that the parties had no objection to offer. If any reply was sent, it was dealt with according to its nature. At the end of the fortnight he (witness) wrote his report upon the case, not having seen the opinions of the other parties to whom the application had been sent. Then, at the next meeting of the Board, he brought up his report, with the documents before the Board. If his report, and the answers received from the neighbours and from the Vestry, were in favour of the application, the Board usually passed it without referring it to the Building Act Committee at all; but not invariably, because the Chairman of the Building Committee looked through the whole of the papers, and if any point struck him which he thought had not been noticed, he got it referred to the Building Act Committee, or took such other action as seemed necessary. But if either of the parties or the Vestry objected, the case went, as a matter of course almost, to the Building Act Committee. In the case of Mr. Bowyer's application, the Vestry objected, so did the adjoining owners, and the matter was referred to the Committee, with his (witness's) report thereon. Asked as to whether it was his personal report, Mr. Blashill said a gentleman from his office viewed the premises, and checked the correctness of the plan sent in by the applicant. The same gentleman then drafted the report for witness, and if he (witness) approved of it, it became his report. Mr. Millwood, as a rule, now did that work, and Mr. Hebb, the Assistant-Architect, looked over it. He (witness) saw the drawings without having seen the draft report at all; from his inspection of the drawings he made up his mind as to the merits of the application, and dealt with the draft report accordingly, after which the report became his. In difficult and disputed cases, the Committee, as a rule, acted on his advice as the Superintending Architect, but he did not always give positive advice one way or another. There was a general uniformity of practice on the part of the Board as to the allowance or disallowance of applications to build forward. Although in disputed and difficult cases of the kind some time was lost in referring the matter to and fro between the Board, the Vestry, and the adjoining owners, yet the great majority of cases were decided without such delay.

Mr. William Bradly, recalled and further examined, produced certain letters and other documents regarding the Europa-place, Deptford, and Greenwich properties.

Mr. Edgar Joseph Harper, recalled, said he was in the employment of the Board, in the same department as Mr. Bradly, and his duties were, generally, to assist Mr. Robertson in the Estates Branch. He (witness) registered particulars of all properties purchased by the Board as soon as they were purchased. The witness gave evidence as to the duties performed by several other gentlemen in the office.

Mr. George Watson Haines, recalled, was asked to explain why he gave 10*l.* to Mr. Lancaster, a clerk in the Architect's office, as deposed to by Mr. Ellis, the secretary to Spiers & Pond. Witness said he had not the slightest recollection of the circumstance, and he did not know Mr. Lancaster. (Mr. Lancaster being asked to stand up, witness said he did remember his face, but did not remember giving him any money.)

Mr. Frederick John Lancaster, recalled, said that he did not receive the 10*l.* from or through Spiers & Pond. Mr. Haines had

evidently forgotten the incident connected with the 10*l.* It was some months after the Criterion plans had been passed, and after the theatre had been reopened, that Mr. Haines came to the office, and passing through a corridor, witness met him, and he (Haines) said, "I have something for you." Witness said "What is it?" Haines gave him a 10*l.* note, and said "It will do for you to go to the seaside." Witness asked what it was for, but Haines told him to "never mind." That was the only payment of the kind witness ever received.

Mr. Haines, recalled, said he had no recollection of giving the 10*l.* note to the last witness, but if he gave it, it must have been in connexion with the "Criterion."

Mr. Matthew Goddard, recalled, made several additions to the list of cases in which he had received "presents" of money from tenants of public-houses which came into the possession of the Board, the sums ranging from 10*l.* to 25*l.* and 50*l.*

Mr. John Hebb, Assistant Architect to the Board, was the next witness called, and deposed that he had been head of the Building Act Department of the Architect's office for ten years. He assisted the Superintending Architect in all things which related to building construction, but not in matters of finance or compensation. Questioned as to his applications to theatre managers for tickets for boxes and stalls, he said he only recollected applying for such tickets for two members of the Board, Mr. Furniss and Mr. Fell. Had not made any applications for such favours since he was reprimanded by the Chairman on receipt of Mr. Hare's letter. Did not recollect sending Mr. Lancaster to get boxes or seats at Sanger's Amphitheatre. Lord Herschell was proceeding to examine the witness with reference to the circumstances attending the definition of the line of frontage in the Brixton Rise case, when he (witness) said he wished to make a personal statement. He observed that the Chairman had, on a former occasion, remarked that the Board ought not to have entrusted this important work to a temporary man, and had suggested that witness was incompetent for the work. He should like to say that he had been educated as an architect. He was articled to an eminent man for five years, and travelled abroad for some time,—about a year and a half,—to complete his education. On his return he joined his master,—first as assistant, and afterwards as his partner. He was his master's partner for about ten years, carrying out some very important works, assisting him in all his buildings, and practising at the same time on his own account. He came to the Board with excellent testimonials, and had performed very important duties. He had the control of all work in connexion with the operation of the Building Act and the Metropolis Management Act, so far as it related to buildings. He had acted as Superintending Architect, by Mr. Vulliamy's appointment, and with the consent of the Board. He was a man, he submitted, in every way of equal professional status to Mr. Vulliamy or Mr. Blashill, and was perfectly competent to perform the work in question. But his lordship's remarks were calculated to cast a slur upon his professional character. He had never had any slur or imputation upon him until these last few months. He had always been looked upon as an honourable man. He was an honourable man, and there was no transaction of his life that he was ashamed of, or which would not bear the light of day.

The President said he thought that it would possibly have been better not to have made that observation after the correspondence which has been before the Commission as to the theatres with regard to applications for orders. He hoped the witness did now, however, think that that was an improper proceeding.

The witness said he attached no importance to it. He did not consider that was any imputation on his honour or his honesty. He was led into that correspondence by Mr. Harris. There was nothing in that correspondence of which he was ashamed. It was utterly false to say that he levied blackmail upon Mr. Harris or any other manager.

Other witnesses have since been examined, including Sir Joseph Bazalgette, the Engineer, and Lord Magheramorne, the Chairman of the Board, but owing to the voluminousness of the evidence we must break off here until next week.

We are informed that the Council of the Surveyors' Institution have applied to the Commissioners for an official copy of all the evidence, given or to be given, by surveyors and others during the course of the inquiry.

NOTES ON SEWAGE PURIFICATION BY ELECTROLYSIS.*

THE question of the disposal of sewage has occupied the attention of engineers and chemists for many generations past, and, regarded from a hygienic point of view, cannot be too thoroughly considered.

Before entering into the particular subject upon which I have the honour of being invited to address you, I should like to turn your attention to the various processes tried, and found wanting, since the year 1762.

We have lately heard a great deal about the treatment of sewage with sulphate of iron, lime, sulphate of alumina, permanganates, &c., &c. It is a most remarkable fact that claims have lately been made *in re* the sulphate of iron process as if it were entirely new. The following list will show the fallacy of this (see Table I.) :—

TABLE I.

NAMES OF SUBSTANCES.	Inventor.	Date.
Sulphate of iron	Deboissieu	1762
Chlorine	Hallé	1785
Lime	Estienne	1802
Powdered charcoal	Giraud	1805
Chlorine and chloride of lime	Guyton Morveau	1805
Ashes	Chaumette	1815
Sand	Duprat	1818
Sulphate of iron	Briant	1824
Chloride of soda	Labarraque	1824
Waste chloride of manganese	Payen and Chevalier	1825
Sulphate of lime	Siret	1827
Animal charcoal	Frigerio	1829
Peat	Guibourt and Sanson	1833
Charcoal and calcined marl or river mud	Pottevin	1836
Sulphates of iron and zinc with tan and tar	Siret	1837
Earth, lime and waste substances	Rossier	1837
Peat ashes	D'Arcet	1840
Metallic oxides and carbon	Krafft and Suequet	1840
Chloride of zinc	Sir Wm. Burnett	1840
Schist coke	Hompesch	1841
Trade refuse, charcoal, and ashes	Albert	1842
Powdered lignite	Jourdan	1843
Impure alum	Siret	1843
Sulphate of zinc, charcoal, and clay	Gagnage and Regnault	1844
Persulphate of iron	Baronnet	1845
Schist coke	Du Boisson	1845
Chlorides of iron and zinc	Dubois	1846
Lime and precipitating tanks	Higgs	1846
Nitrate of lead	Ledoyen	1847
Waste salts of iron, lead, zinc, &c., with pyroligneous matters, ashes, &c.	Brown	1847
Pyrolignate and perchloride of iron	Ellerman	1847
Impure chloride of manganese	Young	1847
Dried sea-weed, lime, and sulphate of lime and zinc	Salman	1848
Peat charcoal	Rogers	1848
Charcoal, soot, mineral salts, &c.	Legras	1849
Spent tan, carbonised	Tarling	1850
Fresh bark, sulphate of iron, and peat charcoal	Angely	1850
Metallic sub-salts, as of iron alumina, &c.	Browne	1850
Milk of lime and collecting the deposit	Wicksteed	1851
Acids and metallic salts, and filterations through charcoal, clay, peat, gypsum, &c.	Dover	1851
Lime, sulphates of alumina, and zinc and charcoal	Stothert	1852
Lime, magnesian earth, sulphate of zinc or iron and vegetable charcoal	Gilbee	1852
Sifted ashes, breeze, or peat charcoal	Perks	1852
Sulphate of zinc, potash, alum and sand with waste tan, ashes, lime, soot, &c.	Pinel	1853
Metallic sulphates, metallic chlorides, or charcoal and magnesian salts	Herapath	1853
Salts produced in working galvanic batteries	Dering	1853
Peat or bog earth containing salts or oxides of iron	Dimsdale	1853
Peat and other charcoal and chloride of sodium, &c.	Macpherson	1853
Animal charcoal, alum, carbonate of soda and gypsum	Manning	1853
Magnesia and lime with sulphurous and carbolic acids	Smith and McDougall	1854
Lime and finely-divided charcoal	Wicksteed	1854
Boghead coke	Herapath	1854
Soft sludge from alum works with lime and charcoal	Manning	1854
Peat charcoal carbonised with oil of vitriol	Longmaid	1855
Alum schist or shale, and other aluminous minerals, with lime and charcoal	Manning	1855
Manganates and permanganates	Condy	1857
Superphosphate of lime with magnesia and lime	Blyth	1858

To this list may be added others containing combinations of the above, ringing the changes upon iron, lime, alumina, &c., which illustrate the reckless way in which inventors endeavour to apply their knowledge without first ascertaining what has been previously done in the matter, and how far it has been found to be successful.

In the year 1844, lime, mixed with water, was used for the precipitation of sewage. The sewage precipitate was called sewage guano, and, to cut a long story short, it was found that the product had little or no agricultural value. The late Dr. Letheby (whose pupil I was), in the year 1857 recommended the Metropolitan Board of Works to adopt the lime process to precipitate the sewage of London. He also suggested that sulphate of iron might be tried. In this short paper it is not my intention to criticise the many processes in use at the present time, as there is no doubt all are doing their best to solve the question; but I must protest against sewage farms, where sewage is allowed to percolate through the land without previous treatment. Rye-grass is grown, and ultimately eaten by cattle. Sewage contains myriads of ova; they become attached to the grass and other green fodder; this affects the cattle, produces measley meat, and I need hardly enlarge upon the results of eating it.*

It may, perhaps, seem curious that I should say so much about chemical treatment, when the special subject of my paper is electrolytical; but electrolysis is nothing more than a chemical action produced by an electric current.

It is quite ten years since I carried out my first experiments in electrolysis, but in those days the available electric apparatus had not attained such completeness as we now have in it. I first of all wish to remove an impression which, I have been given to understand, is lurking in some minds—that it is impossible to electrically decompose pure water. Water is easily decomposed, provided the current of electricity is of such intensity that it can overcome the resistance. Nicholson Carlisle decomposed water in the year 1800. The decomposing effects produced are precisely in accordance with the chemical equivalents of the substances electrolysed; for instance, the same amount of electricity that would reduce 56 parts of iron from its solution would reduce 207 parts of lead, or 16 parts of oxygen, &c., &c. This is practically the explanation of the whole system; for the chemical changes which take place in sewage when it is electrolysed depend chiefly on the well-known facts that water and sodium, magnesium, and other chlorides (which are always present in sewage) are split up into their constituent parts. Thus, we have at the positive pole chlorine and oxygen set free, and these elements are liberated in a nascent state, a condition in which they are intensely active, so that the organic matter in the sewage is rapidly oxydised and burnt up to innocuous

* A paper by Mr. William Webster, F.C.S., read at the annual meeting of the Association of Municipal and Sanitary Engineers and Surveyors, as elsewhere mentioned.

* It is fair to say that the accuracy of this statement was strongly questioned by Mr. Strachan, of Chelsea. Mr. Webster said his assertion was based on the statements of eminent chemists.

compounds. So rapid is this action that I will now act on a little Crossness sewage, and produce a disinfecting liquid, which is nothing more or less than hypo-chlorous acid, the strongest oxydising agent that is known. To obtain this quickly I must separate the positive action from the negative by a porous diaphragm. At the negative pole I obtain ammonia, potass, soda, magnesia, &c. So strong is the action of oxide of chlorine that I have found no pressed carbon plates would stand its action. I am therefore compelled in practice to use cut carbon or coke. (Demonstration made.)

It was this fact that made me investigate the cost, and the result was, knowing that iron salts were of great use in precipitating organic matter in solution, that I experimented with iron electrodes, for the oxydising acids produced by this action being probably 100 times more active than any acids produced by chemical processes alone, it necessarily followed that the iron salt produced must have similar properties. The nascent chlorine and oxygen generated partly unite, and, with the water, form hypo-chlorous acid; the positive iron plate being attacked, and ferrous hypo-chlorite formed; but a portion of the hypo-chlorous acid attacks the organic matter, for it is well known that putrefying sewage has a strong affinity for oxygen.

To still further strengthen this action, I have lumps of carbon cast into the iron plates, thus securing a supply of the before-mentioned acid.

The iron plates are common casts run direct from the furnace into this form instead of pigs, and are used for the positive poles, the negative plates being thin rolled sheet. The positive plates are gradually acted on by the acids produced, but the negative plates are not acted on, and will remain in the same condition for years; this is so well known that I need not enlarge upon it. I have estimated that the waste of iron at the positive pole is about 1 gr. per gallon, but, of course, this entirely depends upon the electric current used. The hypo-chlorite of iron formed at the positive pole is acted on by the free ammonia, sodium, potassium, and magnesium hydrates, and the ferrous hydrated oxide precipitated. This particular oxide of iron has the property of combining with organic matter, and it is a peculiarity of this salt to take a white hue, and then by exposure to the atmosphere to become green, and ultimately an ochrey red colour.

This action can be seen almost daily in any dye-house during the dyeing of buffs. The cotton goods (representing organic matter) are dipped into an iron solution, and then passed through an alkaline bath; the shade is green, but slight exposure to the air produces the buff colour, the oxide of iron being precipitated within the fibres of the cotton. The ferrous hydrated or protoxide of iron is so beautifully precipitated, one may say, in its most active condition by this electrolytic process, that it takes up more organic matter than if precipitated chemically, for by chemical precipitation the iron oxide carries a large part of the suspended matter in the sewage with it, but only traces of the dissolved organic matter. In the electrical process the whole of the matter suspended is carried with the oxide of iron, together with a considerable portion of the organic matter in solution, and if necessary, the whole of the soluble organic matter can be oxydised. The precipitate itself is carried to the surface by the numerous bubbles of hydrogen issuing from the negative pole, and the effluent may be run off quite clear from below, or may be run with the precipitate into settling tanks, where the deposit will take place in from half an hour to two hours; the precipitate, being exceedingly flocculent, subsides readily. The sludge formed does not hold so much water as by chemical process, and presses without any addition of lime. The effluent is less alkaline than the natural sewage, and, if necessary, can be rendered neutral by passing through coke filters arranged in such a way that the electric current can be applied, thus further purifying the effluent and delivering it in such a state that, personally, I should have no objection in drinking it. The reason of the alkalinity being reduced is that a small quantity of free ammonia is carried off with the hydrogen gas at the negative pole, and also by the formation of hypo-chlorous acid. It is by means of this coke filter that potable water can be purified either on a large or small scale, and the treated sewage is not liable to secondary fermentation, nor does it form a precipitate when mixed with ordinary river water. The chlorides are slightly diminished in quantity, owing to the escape of nascent chlorine at the positive pole. The amount of soluble mineral matter is not increased in quantity, as in ordinary precipitating processes.

The chloride of lime of commerce is really hypo-chlorite of lime. It has been suggested that the hypo-chlorous acid may possibly be as objectionable in its after effects as the salts of lime; but this is not the case, as hypo-chlorous acid is an unstable compound, which, having delivered up its oxygen in oxydising organic matter, changes into hydro-chloric acid, which neutralises the alkalinity of the sewage.

As I have already demonstrated that hypo-chlorous acid can be obtained in quantities by means of a porous cell enclosing positive pole, so likewise by enclosing the negative pole a solution of ammonia, &c., can be obtained from the raw sewage.

I have brought with me a weak solution of the disinfecting fluid obtained from sewage twelve months ago; also a sample of an effluent eight months old. I have shown that the sewage can be purified to any extent, even to conversion into a disinfectant; it therefore only remains for me to enter into the question of cost, which I will do as briefly as possible, and it is just as well to mention that this will be partly ruled by the particular state of purity you require in your effluent.

The chief expense is the engine power. My experience up to the present time is limited to treatment of about 100 gallons of sewage at any one time; and from a large number of experiments I found it would be possible to treat this quantity with about one-third h.p.; the dynamo and engine were unsuitable for my experiments, as the dynamo was only fit for electric lighting, and the engine twenty-five years old—without a governor; I should, therefore, prefer to think the h.p. over-estimated. The time occupied in treating every 100 gallons varies from five to ten minutes. The consumption of iron was one grain per gallon; the cost of this is easily estimated when one knows the market price of pig-iron. By kind permission of the Metropolitan Board of Works, I have erected works at my own expense at the Crossness Outfall of sufficient capacity to treat sewage at the rate of one million gallons per diem, as I have sufficient confidence in this process to risk the large outlay entailed. For this I have had an Edison-Hopkinson dynamo specially constructed, giving an output of 1,600 ampères and twenty volts.

Unfortunately, the electrical portion of the works is not yet completed, or I should have hoped to have had the pleasure of inviting you to inspect them.

The question of cost resolves itself into this: The more iron plates you introduce into the system the greater the surface, and the lower the resistance; consequently, the less h.p. required. The increase of the iron plates is only an increase of prime cost, and does not mean a greater waste of iron; this means a saving of labour, as the more iron originally used the less frequently it would require renewal.

I hope to prove that by using positive plates 1 in. thick their duration will be from five to ten years. If the proportion of one-third h.p. to 100 gallons in ten minutes holds good, as I am inclined to think it will, then 25 actual h.p. would be capable of purifying 1,080,000 gallons of sewage in twenty-four hours. I should much have liked to have gone into more minute details connected with these experimental tests, but until I have verified the present results on a practical working scale, I feel it would be premature to quote figures.

Appended are the results of a few analyses of sewage before and after treatment:—

Parts per 100,000.

Date of Experiment.	Appearance.	Odour.	Nitrogen as: Free Ammonia.	Nitrogen as: Albumenoid matter.	Nitrogen as: Nitrites and Nitrates.	Chlorine as Chlorides.	Oxygen required to oxydise organic matter.	Total Solid Matter in Solution.	Loss on incineration of total Solids.	Suspended Matters.: Total.	Suspended Matters.: Mineral.	Suspended Matters.: Organic.	Suspended Matters.: Ferric Oxide Fe_2O_3
1888. Mar. 26	Raw Sewage, very turbid and opalescent	Bad	2·59	0·47	None	9·74	1·95	61·72	12·57	65·28	39·47	25·79	7·09
	Effluent, clear	None	2·30	0·30	None	9·19	1·07	57·43	9·14	None	—	—	—
Apr. 20	Raw Sewage, very turbid and opalescent	Slight	1·88	0·19	Trace	5·27	1·17	42·43	7·90	47·31	33·01	14·30	6·13
	Effluent, clear	None	1·63	0·14	0·029	4·67	0·53	38·60	4·10	2·01	1·74	0·27	1·69
Apr. 27	Raw Sewage, very turbid and opalescent	Slight	2·65	0·42	None	16·43	1·24	41·95	5·86	Not estimated.			
	Effluent, clear	None	2·28	0·18	0·017	13·79	0·52	37·40	2·85	None	—	—	—

CANAL WATER CONTAMINATED WITH SEWAGE. LABORATORY EXPERIMENTS.

Carbon Plates.—Average of Forty Analyses.

	Free Ammonia.	Albumenoid Ammonia.
Before treatment	·073	·037
After treatment	·053	·014

Iron and Carbon Plates.—Average Result of Five Analyses of Sewage.

Before treatment.....	——	·431
After treatment	——	·08

Illustrations.

TOMB OF LORD HENRY MARNEY, AT LAYER MARNEY CHURCH.

SOME references to this terra-cotta tomb will be found in our account of the Architectural Association's excursion on Saturday last (see p. 41).

A CORNER OF ELY CATHEDRAL.

THIS illustration shows the interior of one of the small western transepts, as they may be called, though they are hardly transepts in the strict sense, which give importance to the western façade of Ely. The lower work is of transitional character, with the interesting arches which have been sometimes considered (though, we think, erroneously) to have given the suggestion of the pointed arch. The later work above is marked by the wall-arcades of trefoiled arches.

The illustration is from a drawing by Mr. Arnold B. Mitchell.

MONUMENT TO THE LATE EARL DUDLEY.

WE gave a pretty full description of this monument in the *Builder* for June 9th of this year, page 420. We now give an illustration from a photograph. The monument is designed, both the figure and the substructure, by Mr. James Forsyth, and was executed at his studio. The figure is in white statuary marble, the decorative carving on the pedestal of alabaster, and the plinth of red granite. The monument is placed between two piers on the south side of the Lady Chapel in Worcester Cathedral.

SKETCHES AT AND NEAR LAYER MARNEY, ESSEX.

THE porch of Feering Church, and the other sketches on the same page, are referred to in our account (on p. 41) of the recent visit of the Architectural Association to Layer Marney.

ST. GEORGE'S HOUSE, EASTCHEAP.

THIS block of offices occupies some 10,000 superficial feet, and has a frontage of about 100 ft. to Eastcheap, and a frontage to George-

lane of similar extent, with two interior areas each about 30 ft. by 30 ft. The buildings comprise sub-basement, basement, and ground-floor, and five other floors over. The construction throughout is of a very massive and elaborate character. The elevation is in Portland and Beer stones. The contractors were Messrs. Perry & Co., and the architect Mr. Delissa Joseph.

OLD COTTAGE ARCHITECTURE.—II.

WITH regard to the date of old cottages which I have ascribed to the latter part of the sixteenth century, I may cite the Statute of Elizabeth, A.D. 1589, which states its object to be "for avoiding of the great inconveniences which are found by experience to growe by the erectinge and buyldinge of great nombers and multitude of Cotages which are daylie more and more increased in manye parts of this realme." The Act goes on to say that no one is to build or convert buildings into cottages without setting apart at the least four acres of ground to each. It excepts from this rule towns, mines, and factories, and cottages for seafaring folk, under-keepers and others, and also forbids the occupation of any cottage by more than one family.

An Act with some bearing on the subject is that of Henry VII., A.D. 1489, "against pulling down of towns."

This was directed against the wholesale destruction of tenements consequent on the throwing of many parts of the country into pasture, and enacts that no house customarily let with twenty acres shall be pulled down, but on the contrary gives special directions for its repair when necessary, under the king's direction in default of the owner's. This Act was probably not much needed in this particular part of the country, but gives an idea of the class of house then existing.

The Act of Elizabeth shows not only that cottage building was going on briskly, but that, just as still happens, old buildings were being turned into cottages as they fell out of use, owing to the erection of new houses of importance.

The roofing material is generally tile, but on the borders of Suffolk, as at Alfold, stone slates are commonly used, and in buildings of importance these are found further up in the county. Probably thatch was largely used before tiles, as was commonly and is still the case in Kent, and as is the case with some of the oldest cottages in Sussex.

Brick and tile making began to be general early in the sixteenth century, but very probably it was not till the time of Elizabeth that tiles were cheap enough to supplant thatch.

The Horsham, or stone slates, are possibly in some cases as originally put on. Probably it would be difficult to find an original tile roof, as owing to the decay of the laths, the tiles have in most cases been relaid.

The lath used was and is of heart of oak, which would probably be still in good condition if it had not been for the splitting of the lath by, and corrosion of, the iron nails. It is a common thing, in stripping an old roof, to find the whole of the laths detached from the rafters, and the tiling only kept in its place by its own weight. The pins were of hazel or willow, but the delight of the tiler was to get hold of an old elder stump, which was supposed to make the most durable pins of all. I have known all these woods used, though deal has generally supplanted them, and is in its turn replaced by iron.

The making of tile pins was valued by the bricklayer as a useful occupation for winter.

In speaking of the date of weather tiling in my last paper (see *Builder*, p. 10, *ante*), I forgot how far we were advanced in this century; it would probably be safer to give a margin of date back to the beginning of the last century, though undoubtedly by far the largest part of it has been done within the last hundred years.

Of the present illustrations, that of Alfold House represents a building of some importance. The tradition is, as in many similar cases, that a second return-wing has been pulled down, but there seems no ground for this. The L shape is an ordinary one. The doorway led into a part of the hall cut off by the screen from the main hall, and the private rooms were in the return-wing.

The beams of this house are of very good workmanship, and, where the whitewash has flaked off, show the original distemper-colour with floral patterns with which they, as well as the doors, were covered. This was an unusually perfect example of the manner in which oak was commonly treated originally, and would well repay careful examination if it be still in the state in which I saw it some years ago.

Plunks Farm and a house on Shamley-green have similar tracery bargeboards of more elaborate character than usual, and are probably fifteenth century work.

I have drawn the old gable at Shamley-green in its proper position, but by the unfortunate neglect to jack up one corner when it was repaired, it is curiously and unpleasantly out of the level.

The view at Bramley in the inside of a cramped court, shows what was the porch of a house of some importance. The door-posts are well moulded, with characteristic Tudor stops. The "circle" frame-work is found at Tangley Manor and Gomshall close by, and is as elaborate as any in use in this part of the country.

R. N.

SANITARY INSTITUTE OF GREAT BRITAIN:

ANNUAL MEETING.

THE anniversary meeting of the Sanitary Institute of Great Britain was held on Thursday, the 12th inst., in the theatre of the Royal Institution, Albemarle-street, Mr. Edwin Chadwick, C.B., occupying the chair. Amongst those present were Inspector-General R. Lawson, Professor T. Hayter Lewis, Mr. G. J. Symons, F.R.S., Justice H. C. Cunningham, Professor W. H. Corfield, Major Flower, Mr. Rogers Field, Dr. Danford Thomas, and other gentlemen.

The Chairman, in opening the proceedings, claimed in behalf of the Sanitary Institute and other allied institutions that good work had been achieved. He claimed for them a large proportion of the reduced death-rate of the metropolis, which had been got down now to 14 per thousand; while in places which were undistinguished by the same sort of work the death-rate remained unaffected, some of them having a death-rate double that of London. The death-rate of Paris was 27 per thousand, that of Vienna 30 per thousand, that of St. Petersburg 40 per thousand, while the general death-rate of the United States was 47 per thousand. He attributed the reduction which had been achieved in the death-rate of London to sanitary work. Mr. Chadwick concluded by calling upon the chairman of the committee of judges, Mr. Rogers Field, to read the report of the judges on the award of prizes at the Bolton Exhibition.

Mr. Rogers Field accordingly read the report, from which we make the following extracts:—

"We, the undersigned, the Judges appointed by the Council, beg leave to recommend to the Council the following distribution of Medals and Special Certificates, and of Certificates of Merit.

Exhibits which have already received Medals at the previous Exhibitions of the Institute are excluded from awards of Medals, but those Exhibits to which a second Medal would otherwise be awarded receive Special Certificates, and these are distinguished in the following list by asterisks.

MEDALS AND SPECIAL CERTIFICATES.

Class I.—Construction and Machinery.

*Doulton & Co., Lambeth, for Peto Fireproof Flooring.
*Greenall & Co., Manchester, for Steam Washer.
Manlove, Alliott, Fryer, & Co., Nottingham, for Johnston's Dryer.

Class II.—Sewerage and Water Supply.

*Doulton & Co., Lambeth, for Self-adjusting Joint for Stoneware Pipes.
*Heap's Dry Closet Co., Manchester, for Dry Earth Closet without Separator,
International Water and Sewage Purification Co., London, for Material for Filtering Water.
*Morrell's Sanitary Company, Manchester, for Morrell's Cinder Sifting Ash Closet.
*White, W. P., & Co., London, for Nicholls's Soot and Salt Closet.

Class III.—Heating, Lighting, and Ventilating.

Bennis, E., Bolton, for Smoke Preventing Mechanical Stoker and Camel Furnace.
Elliott, Edminson, & Olney, Manchester, for Welsbach's Incandescent Gas Burner.
*Kirkham, J. & W., Bolton, for the Blackman Air Propeller.
Vicars, T. & T., Liverpool and London, for Mechanical Smoke Preventing Stoker and Furnace.

Class IV.—Personal Hygiene, Foods, Filters, and Disinfectants.

Magnetic Filter Company, London, for Spencer's Magnetic Filter.†
*Manlove, Alliott, Fryer, & Co., Nottingham, for Washington Lyon's Steam Disinfector.

Class V.—Miscellaneous Articles of Sanitary Interest not included in the above Classes.

Galloway, J., Bolton. for "Lightning" Fire Extincteur.
Haslam, J., Bolton, for "Reality" Hand Fire Extincteur.
Lovibond, J. W., Salisbury, for Tintometer.

CERTIFICATES OF MERIT.

Class I.—Construction and Machinery.

Gregson, J., Bolton, for Removable Rain-water Pipe.
Hindle, Norton, & Co., Oldham, for "Acme" Door-Check and Spring.
Sanitary Dry Lime Co., Bootle, for Sanitary Dry Lime.*
Thompson, H. & Co., London, for Magnetic Oxide Paint.†
Wright & Co., London, for Fireproof Fixing Blocks.

Class II.—Sewerage and Water Supply

Cuerden, R., Bolton, for Morrison's Spray Lavatory.
Cuerden, R., Bolton, for Shanks's "Imperial" Lavatory.
Cuerden, R., Bolton, for Shanks's "Reliable" Water-waste Preventer.
Cuerden, R., Bolton, for Shanks's "Tubal" Wash-out Closet.
Doulton & Co., Lambeth, for Stoneware Safety Pipes, in Long Lengths.
Doulton & Co., Lambeth, for Improved Siphon Flush Tank.
Parkinson, Sweaney, & Co., Manchester, for Air-tight Soil Pail, with Slide Catch.
Robertshaw, J., Manchester, for Laws' Pathway Rubbish Receiver.
Vause, J., & Son, Bolton, for Cast-iron smooth Bore Drain Pipes and Fittings.
Vause, J., & Son, Bolton, for Craig's White Enamelled Sinks.
Vause, J., & Son, Bolton, for Rufford's Enamelled Fire-clay Bath.
Vause, J., & Son, Bolton, for Shanks's "Imperial" Lavatory.
Vause, J., & Son, Bolton, for Shanks's "Reliable" Water-waste Preventer.
Vause, J., & Son, Bolton, for Shanks's "Tubal" Wash-out Closet.
Vause, J., & Son, Bolton, for Shanks's Urinal with Tilting Flusher.
Vause, J., & Son, Bolton, for Shanks's Wash-out Closet and Cistern combined, for Country Use.
White, W. P., & Co., London, for Nicholls's Soot and Salt Urinal.

Class III.—Heating, Lighting, and Ventilating.

Control Air Propeller Company, Bolton, for Humidifier and Air Inlet.
Elliott, Edminson & Olney, Manchester, for "National" Kitchen Range.
Hancock, F. & C., Dudley, for New Cooker and Steamer.
Hargreaves & Bardsley, Oldham, far "Eclipse" Gas Governor.
Maritime and General Improvement Company, London, for Portable Electric Glow Lamp.
Stott & Co., Manchester, for Combined Gas Governor and Cut-off Valve.
Wilson, Charles, & Son, Leeds, for Open Gas Fire.
Wilson, Charles, & Son, Leeds, for Gas Kettle.

Class IV.—Personal Hygiene, Foods, Filters, and Disinfectants.

Calvert, F. C., & Co., Manchester, for Soluble 70 per cent. Carbolic Acid.
Hembry & Co., Manchester and London, for "Through-colour" Linoleum.
Morrell's Sanitary Company, Manchester, for Cinder-Sifting Dustbin.
Peck, J. H., & Co., Wigan, for Ambulance Stretcher for Use in Mines.

The following, which have gained awards at previous exhibitions, are now so well known, and their merits are so fully appreciated, that the judges do not think it necessary to make any further award to them:—Moule's Earth-Closet, Calvert's Pure Carbolic Acid, Potts's Edinburgh Sewer Trap, Buchan's Disconnecting Trap, Buchan's Access Pipe, Stott's Mercury Gas Governor.

We regret that we are unable to recommend the award of the Richardson Medal.

The report is signed by Mr. Rogers Field, B.A., M.Inst.C.E. (chairman of the judges); Mr. A. Wynter Blyth, M.R.C.S.; Prof. W. H. Corfield, M.A., M.D.; Mr. W. Eassie, C.E., F.L.S., F.G.S.; Mr. Baldwin Latham, M.Inst.C.E.; Mr. Henry Law, M.Inst.C.E.; Prof. T. Hayter Lewis, F.S.A., F.R.I.B.A.; Mr. Louis Parkes, M.D.; Mr. J. Wallace Peggs, A.M.Inst. C.E.; and Mr. Ernest Turner, F.R.I.B.A.

The Chairman then distributed the awards as the names were read out, and in doing so he commented upon the very important progress which had been made by the Messrs. Doulton, their manufactures especially denoting great progress in sanitation. Some decisions had yet to be received in respect of the advance in economy of cooking by gas instead of by wild flame. He was assured that offers were now being made to manufacturers in Manchester to do the work of the steam-engine by gas at two-thirds of the price of the present wild flame. If that could be accomplished, away would go the smoke, and down would come the tall chimneys, and that would enormously facilitate the sanitation of the metropolis and other places where manufactures were carried on. At one place in America all the engines were now worked by gas instead of steam, it being found more economical.

Dr. B. W. Richardson, F.R.S., then delivered an address on "The Storage of Life as a Sanitary Study." The following is an abstract of the address:—

Dr. Richardson opened by referring to instances of long life in the lower animals and in man. These, by some peculiar process as yet but little investigated, hold life as a long possession, and to this faculty he applied the

* These were exhibited at York, but the testing was not completed in time for the last report.

† This was exhibited at Leicester, but the testing was not completed in time for the last report.

term "the storage of life," speaking with special regard to human life, because up to this time the sanitary question is confined chiefly to members of the human family, and because the storage of life, by aid of sanitation in that family, opens up for sanitarians a wide field for investigation and labour. The problem placed before the society was then shortly stated as follows:—Certain proofs of the power of the human body to lay or store up life to a prolonged period are admitted. What are the conditions which favour such storage, and how can we promote such conditions? The conditions were next stated, in the following order:—

(1). Hereditary qualification. (2). The virtue of continency. (3). Maintenance of balance of bodily functions. (4). Perfect temperance. (5). Purity from implanted or acquired diseases. These were then taken up *seriatim*, the influence of heredity having the first place. Many details of the effects of heredity were supplied, amongst others, that if the ages at death, from natural causes, were obtainable of the parental lives of a man or woman through three generations, the average of their ages,—the sum total of them divided by six,—might be accepted as the commercial value of the last life. To this rule there were some variations, to the effect that, taking the age of sixty as a medium point, the value of the last life was less under that point, greater above it. From this topic the lecturer passed to the study of temperaments as connected with life storage, showing that the bilious and sanguine temperaments are the best for long life, the nervous and the lymphatic the worst. In treating on the virtue of continency as an aid to long life, Dr. Richardson's argument went completely against the grosser advocacy of the Malthusian doctrine. He maintained that under a proper sanitary and healthful *régime* there would be no danger of, nor trouble from, over-population; that all artificial means to suppress population, even if they succeeded in respect to reduction of numbers, would lead to the development of a feeble race,—a process of bad sanitation. The work of the sanitarian, as it is now in progress, is the best calculated to insure this success without recourse to any extreme or doubtful method. In the third division of his discourse, the speaker dwelt on the sustainment of balance of the working organs of the body as a means of keeping up the storage of life. A body comparatively weak, but with all the organic structures in good balance, is calculated to live longer that a finely-made body with one even of its vital organs enfeebled or diseased. Hence the importance of proper and scientific training of both mind and body, training that should become part of the education of every child in every school in the land. The fourth topic considered brought under consideration what the author called perfected or all-round temperance,—temperance in speech, action, thought, as well as in matters of eating and drinking. We may consider that whatever quickens the action of the heart beyond its natural speed and force, is a stimulant; and, in proportion to the unnatural tax inflicted by it is a reduction of the storage of life. This was illustrated from many points of view, the prime lesson advanced being that every luxurious mode of life, like every fast mode, is of a certainty a shortener of the natural term, even in those who by the advantage of belonging to a long-lived stock, are naturally fitted for good storage. All luxuries, therefore, are bad for long life; and the luxurious use of stimulants of every kind is detrimental, the alcoholic stimulants being without concealment the most injurious. The prevention of the damaging diseases formed the last subject of study. Here the art of the sanitarian comes into most effective play; and whoever in the sanitary line of research helps to remove these impediments by getting at and removing their causes, is one amongst the truest friends of humanity, and one who is assisting specially in the storage of life, which must be laid up in the first and retained in the last stage.

The Chairman.—It is my duty to move the thanks of this meeting to Dr. Richardson for the great and profound address he has submitted to us on this occasion. His address may well be studied by all sanitarians. There is only one point upon which I would immediately observe, and it is this, that our science has so far advanced that we might direct a contract for the reduction of the death-rate. I most certainly think that we might, even with the very rudimentary advances which have been made, direct a contract for the advancement of the lives of all here by some five years or more at the least. We know what may be done by what has been done; but I may just mention what has not been done. In this metropolis, by reason of mistakes of sanitation, ignorance, and other causes, every day some thirty lives are lost in London, and some 15,000*l.* a year in money. In the year no less than 30,000 lives are lost by bad sanitation, by the maintenance of bad conditions, and besides that there is a loss of five and a half millions sterling a year. I may contrast the loss with the gain that has accrued. We have reduced the death-rate in cities and towns by certainly more than one-half, and there has been a gain in life as well as in money. I had recently the honour to show the Crown Princess of Germany over some schools where children's diseases, such as scarlatina, measles, and other diseases, have been positively avoided, and where the death-rate of children has been reduced to one-third of the rate of the general population. I take the opportunity of moving a vote of thanks to Dr. Richardson for his profound address.

Major Flower said it was not often it fell to the lot of a man to second a proposition of thanks proposed by the father of sanitation to one who, like Dr. Richardson, had worked in the front rank of sanitary science. Not long ago a modern hero had taught them how to die: Dr. Richardson had lately taught them how to live. He seconded, with great pleasure, the vote of thanks proposed by the Chairman.

The vote was adopted with acclamation.

Dr. Richardson acknowledged the compliment, and said he had not been working so closely of late years with the Sanitary Institute, but had been connected with it from the starting, and was always glad of the opportunity of placing his services at its disposal.

Mr. G. J. Symons, F.R.S., proposed, and Mr. Rogers Field seconded, a vote of thanks to Mr. Chadwick for presiding.

The vote having been adopted,

The Chairman, in replying, referred to what had been done in India, and mentioned that the death-rate in the Indian Army had been reduced by sanitation, however imperfect, from 67 to 49 per 1,000, and a scheme was now being put forward by which it was hoped to do for the civil population what had already been done for the military population.

UNIVERSITY COLLEGE, LONDON:

CLASSES IN ARCHITECTURE.

THE following prizes and certificates have been awarded:—

Fine Art.—Donaldson Silver Medal, E. A. Runtz of London.—Certificate, 2. Alan C. Walker of Tasmania. 3 and 2nd Prize. Harold R. Luck of London.—*Second Class.* B. F. Fletcher of London, J. W. Little of London, P. D. Smith of London.—*Third Class.* M. A. Green of Bath, E. A. Williams of Upper Norwood, F. E. Williams of London.

Construction.—Donaldson Silver Medal. Horace Helsdon of London. 2nd Prize. Harold R. Luck of London.—Certificates, 3. Alan C. Walker of Tasmania. 4. Wm. D. Claridge of London. 5. J. W. Little of London. 6. J. Borrowman of Godalming.—*Second Class.* A. W. Carne of St. Agnes, M. A. Green of Bath, E. C. Hanson of London, H. C. Lander of London.—*Third Class.* A. Sealy-Allin of Co. Cork, E. Finch of Roehampton, A. G. Turner of Anerley, E. A. Williams of Upper Norwood, F. E. Williams of London.

Modern Practice.—Prizes, *equal*, Gordon P. G. Hills of London, Alan C. Walker of Tasmania.—Certificates, 3, *equal*. Harold R. Luck of London, Oscar Oertel of London. 5. E. A. Hellicar of Bromley.—*Second Class.* E. A. Williams of Upper Norwood.—*Third Class.* M. A. Green of Bath, H. Lazareck of Aldershot, W. W. Wilson of Leytonstone.

Professor Roger Smith's prizes for drawings illustrative of the work of the classes were awarded as follows. *Fine Art Prize*, divided between E. A. Runtz and A. C. Walker. *Construction Prize*, divided between John Borrowman and H. C. Lander.

Land at Dovercourt.—On Wednesday next, July 25, as will be seen by our advertisement columns, Mr. F. C. Kettle will conduct a sale of building land at Dovercourt.

THE NATIONAL REGISTRATION OF PLUMBERS.

UNDER the presidency of the Mayor of Newcastle-on-Tyne, a largely attended public meeting was held on Monday in the Council Chamber "to consider the registration of qualified plumbers."

Deputations, in most cases consisting of the Mayor, Medical Officer of Health, and Town Clerk, attended from the Corporations of Jarrow, Gateshead, Sunderland, North and South Shields, Durham, Darlington, Stockton, the Hartlepools, Tynemouth, Middlesbrough, Whitby, Carlisle, Whitehaven, Kendal, Blyth, and other places.

Councillor Winter moved "That a District Council for Northumberland, Durham, Westmoreland, Cumberland, and North Yorks be formed to carry out the system of registration for that district, and that the Council shall consist of master and operative plumbers and the public."

Professor Garnett seconded the motion, and gave an account of the work done in technically educating plumbers; and said he was authorised by the masters and operatives of the district to express their approval of the registration system.

The motion was unanimously carried.

ARCHÆOLOGICAL SOCIETIES.

Bristol and Gloucestershire Archæological Society.—The thirteenth annual summer meeting of this Society commenced on Monday last, in Gloucester, and was continued until Thursday. We defer a more detailed notice until next week.

Royal Archchæological Institute.—As we have already mentioned, the annual meeting of this Institute will be held this year at Leamington, commencing on Tuesday, August 7th. The President of the meeting will be Lord Leigh. The Antiquarian Section will be presided over by the Rev. J. Hirst, the Historical Section by the Rev. W. Hunt, and the Architectural Section by the Worshipful Chancellor Ferguson, F.S.A. There will be excursions by road or rail to Stratford-on-Avon, Banbury, Broughton Castle and Church, Shutford, Compton Wynyates, Bloxham, Adderbury, Warwick, Guy's Cliff, Kenilworth, Stoneleigh Abbey, Baginton, Coventry, Hatton, Baddesley Clinton, Temple Balsall, Knowle, Solihull, Meriden, and Berkeswell; and, on two supplementary days, to Leicester and Melton Mowbray.

Surrey Archæological Society.—The annual excursion of this society was held on the 11th inst., Ockley, Capel, and Oakwood being visited, under the presidency of Major Alfred Heales, F.S.A. Owing, probably, to the threatening weather, there was a very small attendance, those present including Messrs. T. Milbourn (hon. secretary), W. F. Potter, Rutherford, F.S.A., Ralph Nevill, F.S.A. (Guildford), and others. Conveyances met the party on their arrival at Ockley Station at 12·23, and they were driven to Ockley Church, of which Mr. Ralph Nevill, F.S.A., F.R.I.B.A., gave a description. He said there was no mention of a church in Domesday, and, indeed, the mention of Ockley at all was obscure. The Rector (Rev. F. P. Du Sautoy) had given him a reference, unearthed by Mr. O. Fflahertie, of Capel, in the registers of Winchester, of the date 1336, which granted a dedication of the church, and which church was stated to be "formerly founded, destroyed, and newly and totally restored as, we understand, from the foundations." It was evident that the church was built in time for re-dedication in 1336. Of this date was, doubtless, the good window on the south side, which was really almost the only piece of antiquity in the church. During the restoration, everything possible was saved, by the care of the Rector. The chancel had a brick east wall, and the porch was apparently of the sixteenth century. The tower was rather a puzzle. The tradition was that it was built to fit the bells about 1600, but it was not clear that the four arches inside were of the same date. On the whole he was inclined to think the arches were those of the original central tower of the church mentioned as destroyed in 1336, at which period the central tower was left at the west end. After allusion to the registers, which were unusually early, Mr. Nevill drew attention to what tradition held to be the site of the Castle, on the site of the present farm buildings adjoining, where could

be traced the moat by the ponds and what seemed to have been a ditch, and on two sides the stream formed a natural moat. In building a wall there a few years ago the workmen came across a quantity of pottery, the fragments which were preserved being of a fine and interesting vessel of the Saxon date. If the contemplated removal of the society's museum to Guildford Castle was carried out, he hoped there would be an extra incentive to the preservation of all such interesting memorials. The company afterwards proceeded to Ockley Court Farm, and in one of the outbuildings Mr. Nevill read a paper on the site of the old castle and the battle of Ockley between the Danes and Saxons. He described the course of the old Stane-street, and alluded to the interesting remains of ancient camps around that neighbourhood, dealing more especially with Thundersfield, which the late Mr. Godwin-Austen thought might be one of the enclosures in the woods that Cæsar described as held by the ancient Britons at the time of his invasion, and they certainly answered this description. There was, however, no doubt a Roman camp on Bury Hill, Dorking, as was shown by the survival of the name "The Nower" adjoining it. The company, after luncheon, drove to Oakwood Church, where the hon. secretary, Mr. Thomas Milbourn, read an interesting paper on the structure. He mentioned that the church was erected as a chapel of ease to Wotton, Abinger, Ockley, and other parishes adjacent, and in the county of Sussex. The tradition was that the chapel was built and dedicated to St. John the Baptist by Edward De La Hale, a knight whose estate was in the neighbourhood, and who was supposed to have built Hale House, in thankfulness for his son's life being saved from a wild boar in the chase. The date of the church was about 1210 or 1220, probably the latter date, and as they had it on record that Edward De La Hale was not buried until 1430, the church was probably founded by some earlier members of his family. After going through various vicissitudes in the reign of Henry VIII. to the time of Elizabeth, he stated that in 1709 two gentlemen, Mr. Haynes and Mr. Gough, sold the three bells to raise the fund for restoration, and from this time, and especially by John Evelyn, the church had been greatly assisted by the Evelyn family. The register began in 1696, when there was a record of its plate, which was now in the possession of Mr. Evelyn at Wotton, and was of pewter. He described the very fine brass in the chancel, representing a knight in armour with coat of arms; also the interesting wall paintings discovered in 1879, when the church was restored. The Vicar, Rev. E. A. Knowles, kindly exhibited tracings of these to the company, and the Rev. E. A. Chichester (Dorking), late vicar, read an interesting old document or petition, presented to Edward VI., and again to Queen Elizabeth, praying for the opening of the church for worship, it having been closed for some time. Capel Church was afterwards visited.—(*Abridged from the Surrey Advertiser*).

"A NEW FORM OF DRAIN-PIPE."

SIR,—It is very interesting to find two of our able masters in architectural design turning their attention to improving drain-pipes. It is also curious to see how the two have both hit upon the same style of "improvement." The idea of laying pipes in lower and upper halves is not new; but, setting that aside at present, the question is—Is the alteration proposed by Messrs. R. Norman Shaw and T. L. Watson really an improvement? I think not, and for the following reasons:—

Seeing that drain-pipes now are often put to either the smoke or water test, they ought to require as little jointing as possible, and they ought also to be strong. Now this pipe, whether it be Mr. Watson's or Mr. Shaw's, being of U-shape in section, is naturally very weak, while, being open all along the top, that implies *two* jointing surfaces all along two sides of the top of the pipe in addition to the round joint at each 2 ft. or 3 ft., according to the lengths of the pipe. Now, as this means three times as much jointing-surface as with the ordinary pipes, and three times as much cement to be used, *I* do not see where the "improvement" comes in. In fact, I consider the use of such a pipe for ordinary drainage work in and about houses an absurdity. In my opinion, Mr. Watson is entirely wrong in the assertions he makes on p. 32, viz.:—1st. That the joints inside can be better finished off than with the ordinary pipe. 2nd. That the U-shaped pipe can be more accurately laid. 3rd. That the U-shaped pipe can be more satisfactorily tested than any other kind of drain-pipe. 4. That said pipe is an advance on any other in use.

An ordinary round drain-pipe could be easily jointed to stand five times the water pressure that Mr. Watson's pipe could stand. Then, again, in laying the ordinary pipe, if one of my access-pipes are put in every 20 ft. or so, the interior of the drain-pipe can be easily examined, and the drain-pipe can be easily plugged up and flushed at a moment's notice in a way impossible with Mr. Watson's pipe. Mr. Watson appears to me to write in ignorance of what is being done with the drain-pipes in the market. He could hardly be expected to know so much about a number of the practical details as one who has made a personal special study of improved drainage for the last dozen years and more.

W. P. BUCHAN.

Glasgow, July 14th, 1888.

BABLAKE SCHOOLS, COVENTRY.

SIR,—A notice appeared in the *Builder* of July 14 [p. 33], announcing that the trustees of the Bablake Boys' School, Coventry, had appointed Messrs. John Giles, Gough, and Trollope their architects to carry out these schools. I beg to inform you that in the open competition for these schools, these gentlemen were placed second by the assessor, Mr. J. Oldrid Scott, and the first place was awarded to my designs. The trustees, however, without any explanation, set aside the assessor's award.

REGINALD T. BLOMFIELD, M.A.,
Architect.

"DRY ROT."

SIR,—Referring to the recent correspondence in your columns, it seems to me that one cause of this evil, little thought of generally, lies in the careless way in which buildings of all kinds are too often, during their construction, left open to the damp and rain to sow the seeds of the "dry rot" harvest. Often does a great rainstorm so flood a building that (on account of the pressing necessity of completing the work in a given time) no steps are taken to ensure each part being in a proper state of dryness before being covered in, and (in many instances) the air almost excluded. This is especially the case where timbers rest on damp walls, setting the enemy to work at once under the most favourable circumstances for the development of the rot. How, in these days of competition, a remedy may be provided is difficult to say. Meanwhile, the fact remains.

LUX.

The Student's Column.

ARTIFICIAL STONE.—III.

Semi-Vitrified Stones.

THIS section includes artificial stones, in the formation of which partial vitrifaction has been effected, with the result generally of producing much more porous and workable products than are possible in the previous section. Common bricks, terra cotta, and similar architectural stoneware are well-known types of this class of stone, but in this article only a few special compositions will be referred to, for the all-sufficient reason that so great is the number of special brickmaking mixtures and methods that a series of articles devoted to this one branch of the subject would be necessary to satisfactorily discuss it.

The revival of the manufacture of artificial stone, or of that class of it known as terra-cotta, according to a paper read by Mr. C. Fowler before the Institute of British Architects in 1850, took place towards the end of the last century. A Miss Coode, of Lyme Regis, was the "revivalist," this lady having started about that time a pottery at Lambeth for the manufacture of an artificial stone which was used in many important works, such, for example, as the rood-screen or loft in St. George's Chapel, Windsor. The stone was generally composed of a mixture of white potter's earth, pulverised stoneware, powdered glass, and, for some finer purposes, a little Reigate sand and powdered flint was added. These ingredients were carefully mixed with water in a pug-mill to a stiff consistency, moulded, dried slowly, and burnt.

The utilisation of river mud, sand, and siltage in the making of bricks or artificial stones has been known from the earliest ages, and has been the subject of several patents in more recent times; one, for example, being that of J. White, the younger, of Whitehall Wharf, who, in 1809 (No. 3,269), employed the deposit of the Thames used either alone or mixed with sand and clay, the articles being moulded, dried, and baked in the usual way.

A very light, porous brick has also been made from a mixture of clay and peat moulded together and burnt.

E. Brady's composition, patented in 1884 (No. 16,251), intended as a substitute for stone, brick, &c., consists of clay, preferably known as fire-clay, mixed up with any vegetable pulp, such as jute, Manilla, straw, grasses, &c., and a similar quantity of finely-sifted coal ashes; about 5 lb. of pulverised feldspar, and about an equal quantity of caustic potash or soda dissolved in water are next added in sufficient quantity to bring the mass to a proper consistency, and it may then be suitably coloured, moulded, compressed, and finally baked in a kiln.

In an early patent (1796, pat. 2,098) a mixture of limestone, clay, and sand was strongly baked to produce very hard, rough stone.

For the production of a smoother and more ornamental though hard stone, P. Brookes, in 1825, used mixtures containing such materials as granite, feldspar, clay, marl, flint, &c., finely pulverised, thoroughly mixed, and rolled between metallic rollers, and then baked to produce partial vitrifaction. About twenty-six years later was patented the use of elvan, a granitic rock which weathers white, largely found in Cornwall, on Dartmoor, in Ireland, and in other places. This rock was to be powdered, mixed with water, moulded into desired shapes, and baked in a similar way to earthenware. If a harder stone is required, flint, sand, or quartz is added, and the articles burnt at a higher temperature. About a year later Messrs. Way & Paine proposed to use the siliceous clay found near Farnham in Surrey, and in other localities, and which contains amorphous silica, which, being soluble in aqueous solutions of alkaline carbonates and hydrates, is termed "Soluble Silica," of which more anon. To produce a superior variety of ornamental or plain bricks or slabs suitable for lining walls, either the siliceous clay, above referred to, is used, or common clay is taken and mixed with from 15 to 30 per cent. of the soluble silica and moulded, dried, and burnt. A gentle burning will produce a material comparatively soft and capable of being sawn like wood. At this stage, if desired, the articles may be cooled and finished with tools, and then more strongly burnt until they become very hard and capable of taking a polish like granite. The patentees further point out that the greater the proportion of silica the more open is the texture of the stone, and that the moulding can only be done satisfactorily by pressure.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,608, Wood Veneers. F. T. Hemming.

The process which is the subject of this patent is applicable to wood mounted on metal, and consists in affixing the wood veneer on the surface of the metal to be treated with copal varnish. The veneer is applied when the varnish is "sticky" or "tacky," and the metal and wood together are passed through a rolling-machine or otherwise subjected to heavy pressure.

10,762, Terra Cotta or Firebrick Domestic Fireplaces. W. Lewis.

The fireclay backs made in accordance with this invention are constructed in sectional pieces, so as to allow the several parts to expand under the influence of heat, and to contract in the process of cooling, without risk of disintegration or cracking. The backs are also securely locked to the jambs so securely that alternate heating and cooling will not separate them one from the other. The joints are dove-tailed or joggled, and each piece fits into corresponding pieces on either side.

11,829, Locking Sash-fastener. W. Crozier.

The improvement which is the subject of this patent consists in forming lateral extensions upon the shank of the well-known knob or thumb-piece, which extensions enter a circular hole, in the staple, when the bar is pulled under the latter. This extension being turned in the said hole is prevented by the comparative narrowness of the slot at which they were entered from being withdrawn from the staple until it shall have been turned back to the relative position occupied at the moment of entering.

14,990, Metallic Reversible Tread for Steps, Stairs, Pavements, &c. J. Knight.

The main object of this invention is to provide a metallic reversible stair tread, which will have a very smooth surface and great durability, and afford also a secure footing, and be non-absorbent. The steps, when worn, can be replaced without noise or hindrance to business, and, being reversible, afford two sides for wear. The slab is fitted into the tread of the stair, and retained in position by screws or other fittings. Preferably, hardened lead is used.

13,342, Improved Window Sash. R. Platt.

The novelty claimed in this invention is in securing the horizontal lever ordinarily used in sash-fastenings. A T-shaped groove is made in the lever, and a corresponding T-shaped rack fits into this, and a pin passing through the catch fastens all together.

3,752, Composition for Roadways, Pavements, Building Blocks, &c. G. S. Lee.

According to this invention, slag and asphalte are used. The slag is finely pulverised, and fireclay and talc, together with red oxide of iron or the brick-clay of commerce, also finely pulverised, are mixed. When mixed, the mass is pressed, and petroleum and turpentine added. Afterwards the blocks are subjected to great pressure, and the block heated to burn out the petroleum and spirit. It is then cooled, and is ready for use. Fireproof paint is made by utilising some of the said materials as a base.

4,947, Fireproof Partition, Ceiling, Roof, &c. T. Bailey.

According to this invention, iron sheets, with fireclay or plaster, are used, or gas-piping surrounded with fireclay is used, but principally dovetail, ribbed, and grooved metallic sheets, with plaster coating, are employed.

NEW APPLICATIONS FOR PATENTS.

July 6.—9,821, J. Peckover, Stone Saws.—9,826, I. Kirkbride, Window-fastenings.—9,832, J. Wilson, Ventilators.—9,856, B. Munster, Window Sashes and Sash-frames.

July 7.—9,876, T. Clarke and C. Crapp, Preventing cellars, rooms, yards, &c., from flooding from drains or sewers.—9,905, T. Barter and J. White, Opening and Closing Fan and Skylights, Window Sashes, &c.

July 9.—9,930, J. Cawdary, Carpenter's Mortise Gauge.—9,962, W. Cooper, Water Closet Structures.—9,968, W. Lindsay, Bridges and other structures.

July 10.—9,995, P. Rawlinson, Automatic Air-tight Joint.—10,005, J. Brown and W. Mackenzie, Nails.—10,040, C. Rogers, Wood Screws.

July 11.—10,066, C. Darrah, Ventilators.—10,078, A. Boult, Artificial Marble and Serpentine.—10,099, H. Hart, Brick for building purposes.—10,100, G. Dixon and W. Prettyman, Safety Sash or Window Fastenings.

July 12.—10,146, F. Henninger and J. Fyfer, Sash Fasteners.—10,149, S. Tuddenham, Metal Strips for Sash Bars, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

1,150, J. nnd F. Carr, Sash Fastener.—8,081, W. Rowbotham and W. Fox, Electrical Bells and Indicators.—8,101, M. Syer, Door Latch for Lavatories, &c.—8,173, W. Phillips and C. Tomlinson, Rebated Weather Bar.—8,186, J. Panton, Iron Planes.—8,268, F. Wakefield and W. Worth, Mitreing Mouldings, &c.—8,334, J. Hopkinson, Fastenings and Hinges for Doors.—8,372, J. Palmer, Composition for Paints, &c.—8,515, T. Malvern, Gully Trap.—8,676, J. Goodwin, Raising Window Sashes.—8,681, W. Fisher and C. Church, Securing or Holding Windows.—8,687, E. Newton, Ventilator.—8,723, M. Ashwin, Bricks.—8,850, G. Ginn, Casement Stay.—9,017, T. Ash and R. Peacock, Window Fastener.—9,400, G. Ulbing, Waxing Floors.—9,409, J. Saunders, Sash Fasteners.—9,484, F. Bosshardt, Bath-rooms.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

12,160, A. Roberts, Bakers' Ovens.—12,264, C. Mackey and E. Bailey, Securing Knobs to Doors, &c.—12,291, W. Fraser, Automatic Door Closer and Check.—12,328, A. Melville, Fireproof Curtains for Theatres, &c.—14,229, H. Lake, Wood Paving.—7,617, J. Bardsley, Unions or Couplings for Lead Pipes.—8,011, W. Clayton, Draught-proof Reversible Window.—8,385, J. McConachy, Ventilating Apparatus.—8,443, S. Dawson and Others, Dowelling Boards, &c., together with Metal Dowels.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 2.

By E. F. TAYLOR (at Barnet).

New Barnet—Seven plots of freehold land £1,880

JULY 6.

By DRIVER & Co. (at Bampton).

Bampton, Oxon—Enclosures of freehold land, 86a. 1r. 22p. 1,420
An enclosure of land, 1a. 0r. 3p., freehold 36
Knapp's Farm, and 55a. 2r. 18p. freehold 1,250
An enclosure of freehold land, 8a. 2r. 38p. 90

JULY 9.

By GRAVES & SON.

Notting Hill—45 to 51 odd, 57 and 59, Lancaster-road, 74 years, ground-rent £48 1,350
11, 13, 15, and 17, Basing-road, 74 years, ground-rent £32 615

By R. TYSER & Co.

Chiswick—2, 3, and 4, Red Lion-cottages, 10 years, ground-rent £6 175
Kew—12 to 17, Waverley-cottages, 18 years, ground-rent £6 600

JULY 10.

By G. H. MASTERMAN & Co.

City, Leadenhall-street — Ground-rent of £150, reversion 57 years 4,650
Leadenhall-street—Ground-rents of £80, reversion in 57 years £2,400
Bermondsey—Ground-rents of £103. 5s., reversion in 64 years 2,500

By HAMPTON & SONS.

Liss, Hants—Havelock House and 6¼ acres, freehold 3,500

By DEBENHAM, TEWSON, & Co.

St. George's-in-East—120, Backchurch-lane, freehold 350
Limehouse—1 and 2, Willow-row, copyhold 180
4, 6, and 8, Burn-street, 25 years, ground-rent £2. 16s. 9d. 130
2 to 10 even, Dupont-street, 25 years, ground-rent £5. 3s. 3d. 220

By MULLETT, BOOKER, & Co.

Hyde Park—7, Lancaster-gate, freehold 4,000
South Hayling—The freehold residence, Westfield and 51a. 1r. 2p. 10,000
Queensbury Lodge, with grounds, freehold 990
An enclosure of land, 2a. 1r. 26p., freehold 570
Barn Farm and 39a. 2r. 19p., freehold 1,460
Eastney Farm, and 63a. 3r. 6p., freehold 1,830

By W. A. BLAKEMORE.

Hackney—47, Frampton Park-road, and 26, Loddige's-road, 50 years, ground-rent £2 975
Pimlico—7, 8, 9, and 10, Caledonia-street, 36 years, ground-rent £28. 7s. 1,225
Camberwell—1 to 4, Westhall-road, 57 years, ground-rent £16 875
14 to 16, Westhall-road, 57 years, ground-rent £13. 4s. 600
17, Tindall-street, 73 years, ground-rent £4 210
Regent's Park—The lease and goodwill of 1, Upper Park-place, term 10 years 260
Haverstock Hill—No. 26, term 33 years, ground-rent £14 510

By H. RUTLEY.

Edgware-road—38, Carlisle-street, 27 years, ground-rent £6. 6s. 260
80 and 81, Devonshire-street, 27 years, ground-rent £24 330
Acton—9, Stanley-road, freehold 215
81, Mill Hill-road, freehold 385

By W. H. COLLBRAN.

Waterloo-road—An improved ground-rent of £36, term 34 years 585

By G. STOCKINGS.

Lower Clapton—98 and 100, Glenarm-road, 81 years, ground-rent £8. 8s. 430

JULY 11.

By W. HALL.

Finsbury Park—Ground-rent of £45, reversion in 98 years 1,100
West Hampstead—Ground-rent of £28 a year, reversion in 97 years 665
Ground-rents of £27. 10s., reversion in 98 years 670
Bromley-by-Bow—Ground-rent of £23. 12s., reversion in 72 years 535

By A. WATSON.

Peckham—43 and 45, Lyndhurst-road, freehold 1,150

By BAXTER, PAYNE, & LEPPER.

Halstead, Kent—Freehold cottage and fruit land, 3a. 1r. 2p. 950
Freehold fruit plantation, 3a. 0r. 32p. 750

By J. MCLACHLAN & SON.

Lavender Hill—Plot of freehold land, 1a. 0r. 12p. 3,775
Stanley House, No. 253, Lavender-hill, freehold 1,370

By SEXTON & GRIMWADE.

Tollesbury, Essex—Mell House, and 238a. 2r. 39p., freehold 4,000
Monk House, and six cottages, freehold 1,060
The Manor of Tollesbury Hall, with its rights, &c. 95

By F. JOLLY & Co.

Bow—81, Tredegar-road, freehold 520
36 to 42 even, Eastward-street, 75 years, ground-rent £14 205
24, Gale-street, 80 years, ground-rent £6 80
Mile End—110a, 110, and 112, White Horse-lane; and 1 to 8, White Horse-court, freehold 1,720
Walthamstow—Three plots of freehold land 105
Two plots of freehold land 200

By REYNOLDS & EASON.

Plaistow—Freehold marsh land, 23a. 2r. 0p. 3,450

By H. C. NEWSON.

Islington—Copenhagen-street, ground-rent of £56, reversion in 53½ years 1,905
York-road, ground-rents of £56, reversion in 53½ years 1,990
Rivers-street, ground-rents of £78, reversion in 53½ years 2,250
Sydney-street, ground-rents of £52, reversion in 53½ years 1,530
Canal-terrace, ground-rents of £27, reversion in 53½ years 860
Bath-place, ground-rents of £31, reversion in 53½ years 900
Offord-road, ground-rents of £58. 2s., reversion in 42½ years 2,230
Belitha-villas, ground-rents of £121. 18s., reversion in 42½ years 3,870
Thornhill-road, ground-rents of £20, reversion in 42½ years 720

JULY 12.

By C. C. & T. MOORE.

Mile End—20, Eric-street, 71 years, ground-rent £5 220
Hackney—5, Teesdale-street, freehold 400
Commercial-road East—Nos. 326 and 328, 9 years, ground-rent £4 230

By NEWBON & HARDING.

Highbury—12, Hamilton-road, 56 years, ground-rent £7 315
Clapton—5, Elms-terrace, 59 years, ground-rent £9. 10s. 650

By E. STIMSON.

Camberwell—2 to 5, Station-terrace, 76 years, ground-rent £4 1,055
Wandsworth-road—1 and 3, Rashleigh-street, 79 years, ground-rent £7. 4s. 215
Battersea—16, Verona-street, freehold 250

By D. WATNEY & SONS.

Walworth—25 to 33 odd, Penrose-street, freehold 1,690
35 to 43 odd, Penrose-street, freehold 2,420
45 to 61 odd, Penrose-street, freehold 4,570
1, 2, and 4 to 9, Cottage-grove, freehold 3,000
1, 2, and 3, Bridge-place, freehold 430
Freehold stables adjoining 320
Brixton—61, Loughborough Park, 34 years, ground-rent 1s., and a plot of land in rear, freehold £1,900
Bromley—Denmark-villas, ground-rents, of £25, reversion in 72 years 780
Park-road, ground-rents of £35, reversion in 72 years 1,100

By H. C. NEWSON.

Islington, Wynford-road—Ground-rents of £94. 15s., reversion in 56½ years 3,045
Ground-rents of £24, reversion in 30¾ years 960
Ground-rents of £12, reversion in 30¾ years 630
Barnsbury-road, &c., ground-rents of £60, reversion in 27 years 2,270
Edward-street, ground-rents of £20, reversion in 30¾ years 840
Half Moon-crescent, ground-rents of £15, reversion in 56½ years 600
Charlotte-street, ground-rents of £21, reversion in 33 years 1,060
Muriel-street, ground-rents of £5. 5s., reversion in 33 years 340
Charlotte-terrace, ground-rents of £47. 5s., reversion in 33 years 1,900
Copenhagen-street, ground-rents of £33. 12s., reversion in 33 years 1,790
Ground-rents of £17, reversion in 6¾ years 2,320

By FAREBROTHER, ELLIS, CLARK & Co.

Great Stanmore—The Queen's Head beerhouse and two cottages, freehold 1,350
Harlington, near West Drayton—A plot of freehold land, 0a. 1r. 2p. 250

JULY 13.

By WEATHERALL & GREEN.

Charing Cross-road—A plot of land, area 1,410 ft., freehold 1,400

By TOPLIS & HARDING.

Islington—4, Richmond-road, 53 years, ground-rent £8 300

By C. & H. WHITE.

Stockwell—53, Tasman-road, 87 years, ground-rent £6 200

By R. REID.

Notting Hill—10 and 12, All Saints'-road, 75 years, ground-rent £22 550
Westminster—38, Great Windmill-street, freehold 1,200

By ROGERS, CHAPMAN, & THOMAS.

Camberwell—94, Wyndham-road, freehold 700

By BAKER & SONS.

Hornsey, Turnpike-lane—Maryville, 89 years, ground-rent £8. 10s. 310
West Hampstead—65, Gascony-avenue, freehold 615
Ipswich—A plot of freehold land, 0a. 2r. 0p. 150

By H. C. NEWSON.

Islington—Caledonian-road, ground-rent of £28, reversion in 56 years 1,180
Giffard-street, ground-rent of £22, reversion in 56 years 760
Bemerton-street, ground-rent of £34, reversion in 56 years 990
Lyon-street, ground-rent of £22, reversion in 56 years 850
Copenhagen-street, ground-rent of £30, reversion in 30¾ years 1,490
Brunswick-street, ground-rent of £24, reversion in 30¾ years 1,385
Barnsbury-road, ground-rent of £53. 10s., reversion in 30¾ years 2,165
Cloudesley-road, ground-rent of £25. 4s., reversion in 6¾ years 1,440
Islington-place, ground-rent of £2. 9s., reversion in 6¾ years 910
Barnsbury-road, ground-rent of £21, reversion in 1¾ year 4,310
Denmark-grove, ground-rent of £18, reversion in 1¾ year 2,710
Caledonian-road, ground-rent of £26, reversion in 56 years 950
Lyon-street, ground-rent of £8, reversion in 56 years 400

MEETINGS.

SATURDAY, JULY 21.

Glasgow Architectural Association.—Visit to Bothwell and neighbourhood.

TUESDAY, JULY 24.

Society of Engineers.—Visit to the Barking Sewage Outfall Works. (By steamboat *Celia* from Westminster Pier at 11·30 a.m.)

SATURDAY, JULY 28.

Architectural Association.—Visit to Professor Herkomer's House and Schools at Bushey. (See advt. on first page.)

Miscellanea.

Technical Instruction.—The last of a series of conferences on technical instruction was held on the 11th inst. at the Technical College in Leonard-street, Finsbury. The conference was an open one, and was held mainly for the purpose of discussing the proposals for technical instruction now before Parliament, as they affect all trades. The chair was occupied by Sir A. K. Rollit, M.P., who, in opening the proceedings, said that the two Bills before Parliament,—one of which had now been dropped,—were not of a very satisfactory character. There was a third Bill, an Irish Technical Bill. He hoped that amid all the complications of Irish government, none of them would forget their duty to Ireland in developing her resources and industries. Among the remaining speakers were Professor Thompson, and Mr. Pye of the London Trades Council, the latter of whom protested against any proposal to place manual instruction under the control of the Science and Art Department and of the School Board instead of that of skilled workmen.

Sale of Building Land in the Isle of Thanet.—Sir J. W. Ellis, of the firm of Messrs. Farebrother, Ellis, Clark, & Co. was engaged the whole of Wednesday afternoon at the Auction Mart in disposing of one of the largest freehold properties in Thanet, which has for some time past been submitted to competition. The property consisted of estates comprising in all 570 acres, occupying positions in and near Ramsgate, Margate, Broadstairs, and Sandwich, and including a large area of building and accommodation land, almost adjoining the Ramsgate Station on the South-Eastern Railway, and prominently situated on the main Margate road, to which it possesses a frontage of nearly three-quarters of a mile. The sale also included detached plots of from 1½ to 16 acres each, in and near Ramsgate and Broadstairs. Four large farms, 30 acres of market garden ground, and several marsh farms in the Ash and Minster levels, were likewise included in the sale. The property was submitted in thirty lots, of which ten were building land, containing about 100 acres. The first lot offered, comprising the Whitehall Farm, and containing 41 acres, was sold for 3,600*l*. Amongst the highest prices realised was 3,000*l*. for a plot of building and accommodation land on the main Margate road, containing 20 acres, and 2,900*l*. for an adjoining building plot containing 21 acres. A farm of 51 acres on the Margate road was sold for 3,850*l*., but the highest price obtained during the sale was 6,950*l*. for an estate of 126 acres, described as comprising Linden Farm and Newports, nearly midway between Margate and Ramsgate. The smaller lots sold, containing from two to seven acres each, realised from 250*l*. to 700*l*. Of the entire number of lots submitted nineteen were sold, realising an aggregate sum of 28,225*l*.

The English Iron Trade.—The English iron market continues to improve steadily, if slowly. Since our last review of the iron trade, a fortnight ago, there has not been any relapse worth speaking of. Some districts still seem to lag behind, but the general tone of the trade shows unmistakable signs of greater strength. Pig-iron is, on the whole, firm in price, owing to a well-sustained demand, growing shipments, and decreasing stocks. The Glasgow warrant market maintains its steadiness, although there has not been much business done during the week; and the quotations for the chief brands of Scotch makers' iron display a rising tendency, notwithstanding the immense stocks. Pig-iron in the North of England is very firm, the demand being well maintained at a season usually considered the quietest of the year, and for prompt delivery it is impossible to purchase No. 3 G.M.B. under 32s. a ton, some makers holding out for, and getting, 32s. 3d. prompt. Crude iron is also somewhat stronger in Lancashire, where, up to the present time, there has been most inclination on the part of makers to give way. Hematite iron has fluctuated in the north-west between 42s. 6d. and 43s. for mixed numbers of Bessemer during the last fortnight, and is now in very fair demand at the lower figure. Finished iron is growing more active, and prices are improving, sheets and plates especially feeling the effects of a better trade. The results of the recent quarterly meetings must be pronounced satisfactory, as specifications are coming in more freely. Tin-plates are more briskly sought after, and prices have quite recovered from their recent weakness, the price of tin having gone up. Inquiry is good also for nearly all classes of steel, notably for shipbuilding descriptions. Shipbuilders are very busy, but fresh orders do not seem to be coming in quite as fully as desired by them. Engineers have plenty of work, complaints, however, being still heard as to lowness of prices.—*Iron*.

A Big Blast of Limestone.—In continuation of a series of blasting operations, a big shot was fired at the limestone works of Messrs. T. Beswick & Sons, Peak Forest, near Buxton, on Wednesday afternoon. Forty feet below the surface the rock was tunnelled a course of 80 ft., turning both right and left, and in a chamber at the extremity two tons of powder was placed. The fuze was fired by Mrs. Beswick, and the explosion, watched by hundreds of people who lined the hillsides, occurred in eighteen minutes. The rock lifted in the centre like a huge cone, and then fell in a broken heap almost ready for trucking. It is estimated that 50,000 tons was quarried, the experiment being every way successful.—*Buxton Chronicle*.

Large Sale of Building Land at Bognor. The demand for further residential accommodation at this increasingly popular seaside resort, has led to the Kent and Sussex Land Society purchasing what is known as the Linden-road Estate, situated on the north side of the town, and containing an area of upwards of fifteen acres. Several roads have been laid out on the estate; Linden-road, which runs entirely through the centre of the property, being 50 ft. in width and upwards of 1,500 ft. in length. On Monday last Messrs. Baker & Sons offered the first portion of the estate for sale, at the Assembly Rooms, Bognor, where there was a numerous attendance. The plots submitted were eighty-five in number, and had frontages to Linden-road, Station-road West, Sturges-road, and Circus-road. Mr. Baker, in submitting the property, pointed out that the plots were situated immediately opposite the railway station, and only five minutes' walk from the sea. The frontages of the several plots, as a rule, were from 18 ft. to 20 ft. each, another depth varied from 80 ft. to 150 ft. On the sale commencing there was a very large demand for the several lots, with a keen and close competition. The whole of them found a ready sale, at prices ranging from 32*l*. to 56*l*. each; a corner hotel plot, at the junction of Linden-road and Circus-road, and close to the Assembly Rooms and railway station, being sold for 146*l*.; and a corner shop plot, also close to the railway station and Assembly Rooms, having frontages of 61 ft. and 84 ft. respectively, being sold for 71*l*. The total proceeds of the sale amounted to upwards of 3,000*l*.

Sewerage Works for York.—The Corporation of York have unanimously resolved to carry out works of sewerage and sewage disposal for the city. The City Council in 1886 entrusted Mr. James Mansergh, C.E., with the preparation of a scheme, and in February, 1887, Mr. Mansergh laid before them alternative schemes. Mr. E. G. Mawbey being appointed City Surveyor of York in June, 1887, has recently been associated with Mr. Mansergh in the consideration of this question, and the scheme now unanimously adopted is an amended one submitted by these two gentlemen, which was prepared in order to reduce as far as practicable, without sacrificing efficiency, the originally proposed expenditure. It consists principally of intercepting sewers, together with new tributary sewers for that portion of the City which has been added by the Extension and Improvement Act of 1884. The sewage will have to be pumped, and the system of disposal is intermittent chemical precipitation. The estimated cost is 93,250*l*. The scheme will be laid before the Local Government Board with the least possible delay. It may be mentioned here that the Corporation of the City of York have just, by a very large majority, resolved to increase the salary of the City Surveyor, Mr. E. G. Mawbey, Assoc. M. Inst.C.E., from 350*l*. to 500*l*. per annum.

Building Land in Charing Cross-road. Last week, at the Auction Mart, by order of the Metropolitan Board of Works, Messrs. Wetherall & Green offered for sale a plot of freehold building land, situated on the east side of Charing Cross-road, about twenty yards from its junction with Oxford-street and Tottenham Court-road. The land covers an area of about 1,410 superficial feet. There were several competitors for the property, which was sold for 1,400*l*., being at the rate of nearly 1*l*. per foot.

Festivity.—The *employés* of the firm of R. & W. Wilson & Sons, Wardour-street, Soho, bath manufacturers, &c., held their annual dinner at the Lion Hotel, Farningham, on the 7th inst. The chair was taken by one of the partners, Mr. Clarke, and the vice by another partner, Mr. Williams, Mr. Wilson, the senior partner, being unavoidably absent. Mr. Williams, the junior partner, was presented with an inscribed bronze vase, in appreciation of an association lasting over thirty-six years with the firm as workman and employer.

The Barking Sewage Outfall Works.—These works, which are of great magnitude and cost, were visited on Saturday last by the Association of Municipal and Sanitary Engineers and Surveyors, as elsewhere mentioned; and they are to be visited by the Society of Engineers on Tuesday next. A full description of the works will be given in our next.

North-Eastern Sanitary Association.—The fifth annual meeting of the North-Eastern Sanitary Inspection Association was held on Monday afternoon in the Lecture-room of the Literary and Philosophical Society, Newcastle. The Mayor (Mr. W. D. Stephens) presided. On the suggestion of the secretary (Mr. R. B. Duncan), the annual report was taken as read. The substance of the report has already been published. The Mayor said there were many reasons why a society like that should make itself public, and many reasons why it came before the public at an annual meeting like that. There could be no question,—in fact, it was admitted,—that the Association had done a large amount of good during the past few years. Those connected with the Association had given information to people about their residences, and that information had been of immense advantage to the occupiers of such residences. There had, from time to time, been various outbreaks of scarlet fever and other epidemics in Newcastle; and he thought he might say, without fear of contradiction, that if the residents in those neighbourhoods affected had consulted the Association, they would have had an opportunity of having the drainage of their residences put into a proper condition, and thus their position would have been rendered more secure. He concluded by moving the adoption of the report, which, he said, was one of the most satisfactory reports that had ever been placed before them. Dr. Philipson seconded the adoption of the report. The motion was then put to the meeting, and carried unanimously. Mr. Tennant moved the re-election of the Council as at present constituted. Mr. McChlery, C.E., seconded; and this motion having also been carried unanimously, the meeting ended with a vote of thanks to the Mayor.

A New System of Glazing without Putty.—Macleod's patent system of glazing skylights, &c., without the use of putty, possesses several advantages. There are no screw-holes or nail-holes through the outer surfaces of the bars. Condensation is provided for by a channel on either side of the bar. The cap is self-fixing, by means of a steel wire spring and underlock arrangement, which grips the glass so that it cannot slip down. The new system of glazing is being introduced by Messrs. Treggon & Co., of Jewin-street, at whose works in Brewery-road we have this week had an opportunity of seeing a full-sized specimen of the glazing subjected to water and other tests with complete success.

New Post-office, Penzance.—A new post-office is to be erected at Penzance, Mr. J. Wm. Trounson is the architect.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. .....ton	6	10	0	7	10	0
Teak, E.I.....load	8	0	0	12	10	0
Sequoia, U.S.....foot cube	0	2	3	0	3	0
Birch, Canada .....load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic.....fathom	3	10	0	5	0	0
St. Petersburg.....	5	0	0	6	0	0
Wainscot, Odessa, crown.....	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.100	8	0	0	9	10	0
,, 4th and 3rd.....	6	10	0	7	10	0
Riga	6	0	0	7	10	0
St. Petersburg, 1st yellow	9	10	0	14	10	0
,, 2nd ,, ...	8	0	0	9	0	0
,, white	7	0	0	10	0	0
Swedish.....	7	0	0	15	10	0
White Sea	8	0	0	17	0	0
Canada, Pine, 1st	14	0	0	23	0	0
,, ,, 2nd	9	0	0	15	0	0
,, ,, 3rd, &c.	7	0	0	9	10	0
,, Spruce, 1st	8	0	0	9	10	0
,, 3rd and 2nd	6	0	0	7	10	0
New Brunswick, &c.	6	0	0	7	5	0
Battens, all kinds	4	10	0	11	0	0
Flooring Boards, sq., 1 in., prepared, First	0	10	0	0	13	0
Second	0	7	0	0	9	6
Other qualities	0	4	6	0	6	6
Cedar, Cuba.....foot	0	0	3½	0	0	4
Honduras, &c.....	0	0	3½	0	0	3½
Australian	0	0	2½	0	0	3½
Mahogany, Cuba	0	0	4½	0	0	5½
St. Domingo, cargo average	0	0	4½	0	0	5½
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5½
Honduras ,, ...	0	0	4½	0	0	5½
Rose, Rio .....ton	8	0	0	11	0	0
Box, Turkey	5	0	0	12	0	0
Walnut, Italian .....foot	0	0	4½	0	0	6
METALS.						
IRON—Bar, Welsh, in London...ton	4	17	6	5	0	
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, London.....	5	5	0	7	0	0
COPPER—						
British, cake and ingot..... ton	75	0	0	0	0	0
Best selected	76	0	0	0	0	0
Sheets, strong	82	0	0	0	0	0
Chili, bars	79	0	0	0	0	0

METALS (*continued*).	£.	s.	d.	£.	s.	d.
YELLOW METAL.....lb.	0	0	7½	0	0	7⅝
LEAD—						
Pig, Spanish .....ton	12	17	6	0	0	0
English, common brands	12	0	0	12	6	0
Sheet, English.....	14	2	6	0	0	0
SPELTER—						
Silesian, special .....ton	16	7	6	16	10	0
Ordinary brands.....	16	2	6	16	5	0
TIN—						
Straits.....ton	86	0	0	0	0	0
Australian	86	0	0	0	0	0
English Ingots.....	92	0	0	0	0	0
ZINC—						
English sheet.....ton	18	10	0	19	0	0

OILS.	£.	s.	d.	£.	s.	d.
Linseed .....ton	18	0	0	18	2	6
Cocoanut, Cochin	24	10	0	27	0	0
Ceylon	22	0	0	0	0	0
Palm, Lagos	20	0	0	20	10	0
Rapeseed, English pale	24	0	0	0	0	0
,, brown	22	10	0	0	0	0
Cottonseed, refined	20	10	0	20	15	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	5	15	0	6	0	0
,, refined	7	0	0	12	0	0
TURPENTINE—						
American, in casks.....cwt.	1	6	9	0	0	0
TAR—						
Stockholm .....barrel	0	15	9	0	0	0
Archangel	0	9	6	0	0	0

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Paving Pathways	Willesden Local Board	O. Claude Robson.....	July 24th	ii.
Kerbing, Metalling, and Channelling Works...	Lewisham Board of Wks	*Official*.....	do.	ii.
Southern Approach to Tower Bridge	Bridge House Est. Com.	J. Wolfe Barry	July 25th	ii.
Enlargement of Bank	Com. of H. M. Works...	*Official*.....	July 27th	i.
Warming Church	St. Michael's Church, Aylsham, Com.	.....	July 28th	ix.
Brick Gasholder Tank, &c.....	Brentford Gas Co., Lim.	J. Church	July 30th	ii.
Works of Sewering.....	Hendon Local Board ...	S. S. Grimley	do.	ix.
New Sheds, Stores, &c.	Wandsworth Bd. of Wks	*Official*.....	July 31st	ix.
Club Buildings	Birkdale Con. Co., Lim.	do.	do.	ii.
Various Works	St. Matthew's, Bethnal Green, Guardians ...	A. & C. Harston	do.	ix.
Town Hall and Market Hall	Ludlow Town Council...	H. A. Cheers.....	do.	ii.
Making-up Road, &c.	Hammersmith Vestry...	*Official*.....	August 1st	ix.
Repairing Road	Fulham Vestry.....	J. P. Norrington	do.	ix.
Wood Paving	do.	do.	do.	ix.
Sewerage and Sewage Purification Works	Kingston R.S.A.	J. C. Melliss	do.	ii.
Post Office	Com. of H.M. Works...	*Official*.....	August 3rd	ii.
Impounding Water Reservoir, &c.	Chelmsford Local Board	C. Pertwee.....	August 4th	ix.
Guernsey Granite	Gravesend U.S.A.....	*Official*	August 6th	ix.
New Flood Gates, &c.	Hertford Cor.....	R. Austin.....	August 7th	ix.
Alterations to Workhouse	St. Saviour's Union.....	Jarvis & Son	August 9th	ix.
Engineering Works	Met. Asylums Board ...	*Official*.....	Sept. 15th	ii.
Storehouses	War Department.....	do.	Not stated...	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page
Clerk of Works	Surbiton Imp. Com.....	.....	July 23rd	xiv.
District Superintendent	St. Marylebone Vestry	2*l.* 5s. per week	July 27th	xvi.
Borough Surveyor	Sheffield Town Council	800*l.*	August 9th	xvi.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

ALDRINGTON (West Brighton).—For building voluntary schools at Aldrington, for the accommodation of 215 children, for the rector and churchwardens. Messrs. W. F. Williams & Arthur Lewis, architects:—

R. Humphrey & Son, Hove	£1,110	0	0
J. Barnes, Brighton.....	1,030	0	0
J. Longley, Crawley (accepted)	1,020	0	0
W. H. Sawle, Worthing.....	951	0	0
G. Kerridge, Aldrington.....	930	0	0

BARNET.—For constructing the May's-lane and Bell's-hill sewers, for the Barnet Local Board. Mr. W. H. Mansbridge, surveyor:—

Smith & Allen, Reading	£1,889	13	0
J. Cook, Spalding.....	1,407	0	0
H. Langridge, Croydon	1,350	0	0
T. Dunmore, Crouch End	1,321	0	0
H. Hill, High Wycombe	1,319	8	0
G. Osenton, Westerham.....	1,299	0	0
G. Capper, St. Albans.....	1,287	9	0
G. Bell, Tottenham	1,216	0	0
(Unsigned) Colchester	1,177	0	0
H. Marriott & Co., Winchmore Hill	1,150	0	0
J. Curnow, Barnet	1,080	0	0
W. Nickolls, Wood Green (accepted)	1,043	0	0

BEDFORD.—For alterations to the Balloon Inn, Bedford. Messrs. Usher & Anthony, architects, Bedford:—

Knight.....	£578	0	0
Haynes	564	0	0
Freshwater.....	557	0	0
Warton & Walker	530	0	0
Foster (accepted).....	495	0	0

BLACKHEATH.—For the erection of a cottage hospital. Mr. J. Mechelen Rogers, architect:—

Steer.....	£3,079	0	0
Blow.....	2,724	0	0
Kirk & Randall	2,620	0	0
Smith & Son	2,575	0	0
Staines & Son.....	2,572	0	0
Weeden	2,555	0	0
Outhwaite & Son	2,474	0	0
Dorey	2,460	0	0
Greenwood	2,429	0	0
Martin, Wells, & Co.	2,390	0	0
Jerrard (accepted)	2,387	0	0

BRIXTON.—For the enlargement of schools and new caretaker's cottage at Loughborough Park Chapel, Loughborough Junction. Messrs. W. G. Habershon & Fawckner, architects:—

Higgs	£1,328	0	0
Whitehead	1,297	0	0
Creed	1,277	0	0
Hoopers.....	1,234	0	0
Maides & Harper	1,112	0	0
Groom	1,097	0	0
Castle	1,070	0	0
Gregory	1,055	0	0
Gregar	1,037	0	0

BRONDESBURY.—For the erection of St. George's Presbyterian Church, Willesden-lane, Brondesbury, N.W. Mr. Henry S. Tyack, architect, 6, Duke-street, Adelphi, W.C.:—

Patman & Fotheringham	£4,800	0	0
J. C. Tennant, Willesden	4,300	0	0
Wall Bros., Kentish Town.....	4,249	0	0
J. Woodward, Finsbury.....	3,943	0	0
R. A. Lowe, Chislehurst.....	3,717	0	0
J. Allen & Sons, Kilburn (accepted)	3,465	0	0

CLAPTON.—For alterations, &c., to British Asylum for Deaf and Dumb Females. Messrs. Wadmore & Baker, architects, 35, Great St. Helens, E.C. Quantities supplied:—

C. Forrest	£841	0	0
Goodall	816	0	0
Paine Bros.	791	0	0
Shurmur.....	765	0	0
Stephen Hayworth & Sons.....	735	9	0
Hicks	728	0	0
Kilby & Gayford	710	0	0
Godfrey & Sons.....	680	0	0
W. M. Dabbs, Stamford Hill, N.*	679	0	0

* Accepted.

DRAYTON PARSLOW (near Bletchley).—For additions and alterations to Drayton Parslow Board School. Mr. Frederick Gotto, architect, Leighton Buzzard:—

George Green, Aylesbury	265	0	0
William Muckleston, Leighton Buzzard	158	10	0
G. Heley, Stewkley.....	157	0	0
Full Bros., Leighton Buzzard	138	10	0
J. Harwick, Leighton Buzzard*	95	0	0

* Accepted.

EALING.—For erecting and finishing a house at Ealing Mr. L. A. Shuffrey, architect:—

James Chapman, Hackney.....	£1,445	0	0

[No competition.]

LONDON.—For the erection of a school to provide accommodation for 1,000 children, on the site in Halford-road, Walham Green (Chelsea S[1]), for the School Board for London. Mr. T. J. Bailey, architect:—

H. L. Holloway	£15,790	0	0
W. H. Lorden & Son	15,449	0	0
W. Oldrey & Co.....	15,436	0	0
J. Holloway	15,218	0	0
Stimpson & Co.	15,160	0	0
W. Johnson	15,020	0	0
H. Hart, Great Dover-street, S.E.*	14,745	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a centre for the instruction of deaf and dumb children, on the site in Pocock-street, Blackfriars-road (Southwark F), for the School Board for London. Mr. T. J. Bailey, architect:—

H. L. Holloway	£837	0	0
J. Bullers	721	0	0
G. Parker	705	0	0
J. W. Roy	691	15	0
W. Johnson	690	0	0
T. Simpson.....	665	0	0
T. Bendon, Hammersmith*	652	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the Webber-row School (Southwark E), by 200 places, for the School Board for London. Mr. T. J. Bailey, architect:—

T. Bendon	£2,220	0	0
Atherton & Latta	2,200	0	0
H. Hart	1,952	0	0
H. L. Holloway.....	1,820	0	0
W. Downs	1,768	0	0
G. Parker, Sumner-rd., Peckham* ...	1,705	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a new house for the school-keeper, on the Cranbrook-road site Bethnal Green (Hackney O[1]), for the School Board for London. Mr. T. J. Bailey, architect:—

G. Barker	£551	0	0
F. Britton	550	0	0
J. Webb.....	449	0	0
E. Lake, Park-place, Hackney*	440	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a cookery-centre, on the Raywood-street site (West Lambeth BG), for the School Board for London. Mr. T. J. Bailey, architect:—

T. Henderson.....	£689	12	6
G. Small.....	498	0	0
T. Linfield	497	0	0
W. Johnson	470	0	0
G. Howard, Victoria-road, Battersea*.	416	10	0

* Recommended by the Works Committee for acceptance.

LONDON.—The Works Committee of the School Board for London recommend that, subject to the usual conditions of tendering being complied with, in each case, the following tenders for warming the undermentioned schools be accepted:—

(*a*) *Finsbury* (U).—Baltic-street: Tender of Mr. J. Jeffreys, of No. 10, Great Queen-street, Westminster, S.W., amounting to £275 (exclusive of cutting away, &c.), for warming the school on the low-pressure hot-water system.

(*b*) *East Lambeth* (S).—Sumner-road: Tender of Messrs. Bennett Bros., of Nos. 2 to 10, Lime-street, Liverpool, amounting to £180, for warming the Pupil Teachers' School on the high-pressure hot-water system.

(*c*) *West Lambeth* (V).—Hackford-road: Tender of Messrs. J. L. Bacon & Co., of No. 34, Upper Gloucester-place, N.W., amounting to £228. 10s., for warming the Pupil Teachers' School on the high-pressure hot-water system.

LONDON.—For hot-water apparatus, for Amies-street School, Battersea, for the School Board for London. Mr. T. J. Bailey, architect:—

	School.	Pupil Teachers' School.
London Engineering Co. ...	£1,150 !	£590 !
Körting	710	450
Rosser & Russell	572	412
Heim, Vienna	612	321
Crane	600	300
Boyd	590	275
Benham & Sons	528	329
J. & F. May.....	531	255
Cannon	495	320
Phipson	430	270
Attwood (accepted)	269 !	171 !

LONDON.—For pulling down and rebuilding No. 453, Hackney-road, and for sundry work to 449, 451, 457, and 459, Hackney-road, for Mr. H. W. Lee. Mr. George Chuter, architect:—

F. & F. J. Wood	£1,486	0	0
Laughton.....	1,324	10	0
Winkley	1,302	0	0
G. W. Beale	1,235	0	0
Wetherilt, Lee, & Martin	1,223	0	0
Thomerson & Son, Hackney-road* ...	1,199	0	0

* Accepted.

LONDON.—For sundry repairs, &c., at 7, Gloucester-terrace, Hyde Park. Mr. S. C. Capes, architect, 16, Doughty-street, London, W.C.:—

Whiteley.....	£299	10	0
W. B. Head & Son	245	0	0
J. H. St. John	209	0	0
Langridge & Sons.....	191	15	0

LONDON.—For the erection of three dwelling-houses, and workshops in rear, in Hanbury-street, Spitalfields, for Mr. W. Raydon. Messrs. Hobden & La Rivière, architects, 14, Devonshire-street, E.C.:—

Coulsell Bros., Bethnal Green.....	£1,559	0	0
George Lusk, Mile End	1,545	0	0
Allard, Pentonville	1,525	0	0

LONDON.—For rebuilding Garden House, Mildmay Park, for Mr. J. E. Mathieson. Mr. R. H. Hill, architect:—

		*		†		
Higgs & Hill.....	£3,555	...	—	...	nil.	
Brass & Son.....	3,345	...	£31	...	nil.	
B. E. Nightingale ...	3,320	...	90	...	£1	0 0
O. Craske	3,261	...	52	...	2	0 0
Lawrence & Son	3,212	...	35	...	nil.	
H. L. Holloway	3,190	...	95	...	1	0 0
J. T. Chappell.....	3,183	...	28	...	0	15 0
J. Morter	3,181	...	43	...	0	10 0

* Reduction for yellow deal.
† Difference per rod for solid walls.

LONDON.—For shop fronts and fittings to Nos. 134, 138, 142, 150, and 158, Ossulston-street, Euston-road, for the Ossulston Estate. Mr. E. G. Salter, architect, 156, Ossulston-street, N.W.:—

W. Salter	£397	0	0
Clark, Bunnett, & Co.	299	5	0
F. Sage & Co.....	271	0	0
Drew & Cadman (accepted)	234	0	0

NEW BARNET.—For the erection of business premises, East Barnet-road, New Barnet, for Mr. A. Cooper. Mr. Frederic W. Fryer, architect, 2, Pancras-lane, Queen-street, E.C. Quantities not supplied:—

Baughen.....	£830	0	0
Dixon, New Barnet (accepted)	827	2	6

[Architect's estimate, £800.]

NEWBURY.—For additions at Stargroves, Newbury, the residence of Sir F. W. Carden, Bart. Mr. P. Wilkinson, architect, 17, Lincoln's Inn-fields:—

C. Elliott	£1,309	0	0
E. James.....	1,259	0	0
E. A. Bance, Newbury (accepted) ...	1,218	0	0

PORTMADOC.—For the erection of a vicarage, for the Rev. D. Lloyd Jones. Mr. Thomas Roberts, architect, Portmadoc:—

Jones, Groeslon	£1,160	0	0
Williams, Portmadoc	978	0	0
Lloyd, Portmadoc	950	0	0
Hughes, Portmadoc	940	0	0
Jones, Criccieth and Barmouth*	926	0	0

[Architect's estimate, £933. 13s.]
* Accepted.

SOUTHWARK.—For alterations and additions to factory, Princess-street, Union-street, S.E., for Messrs. Hayward Bros. & Eckstein. Messrs. Henry Jarvis & Son, architects. (Corrected list, in lieu of that appearing on p. 36 of last week's *Builder*):—

W. Johnson	£2,100	0	0
Colls & Sons	2,015	0	0
H. L. Holloway	1,949	0	0
B. E. Nightingale	1,893	0	0
W. Downs	1,887	0	0
Holliday & Greenwood	1,885	0	0
J. Holloway	1,878	0	0
Lawrance & Sons (accepted)	1,821	0	0

SURBITON.—For building two houses at Surbiton. Mr. G. Sherrin, architect:—

Jarvis	£3,128	0	0
Atkins	3,108	0	0
J. Chapman, Hackney	2,888	0	0
Turtle & Appleton	2,805	0	0

UPTON.—For three pairs of semi-detached cottages at Upton. Mr. J. S. Woodward, architect:—

Goad	£1,688	0	0
Whitehead	1,670	0	0
Ford & Sons	1,594	0	0
Nightingale	1,537	0	0
Marsland	1,475	0	0
Hooper	1,426	0	0

WIMBLEDON.—For building two houses at Wimbledon. Mr. G. Sherrin, architect:—

James Chapman, Hackney (accepted)	£2,808	0	0

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PRICES REDUCED. LIST SENT ON APPLICATION.

TWELVE GOLD AND SILVER MEDALS AWARDED.

IRON CISTERNS

F. BRABY & CO.

VERY PROMPT SUPPLY.

LARGE STOCK READY.

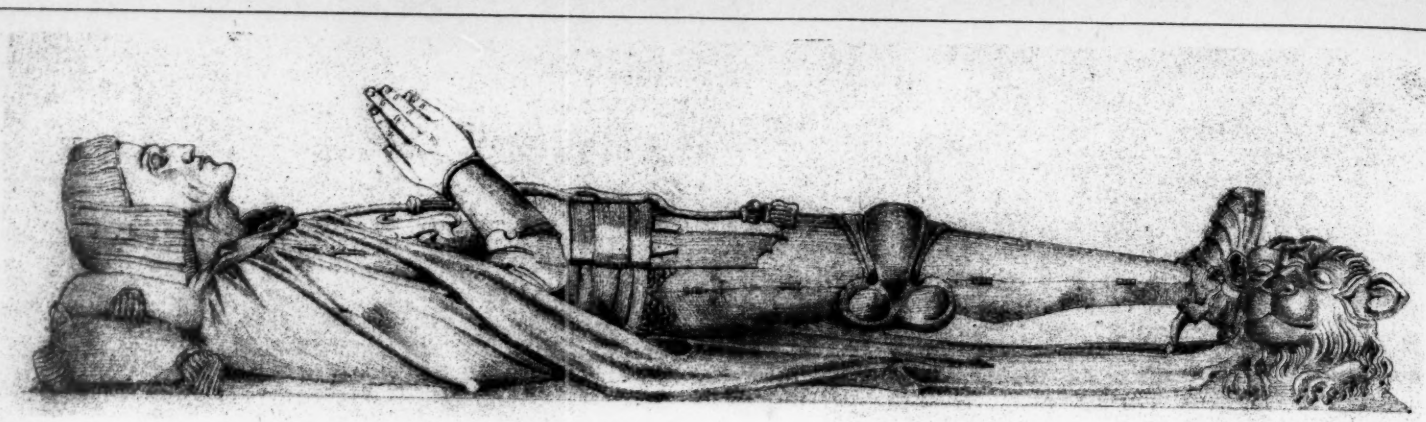
Particulars on application.

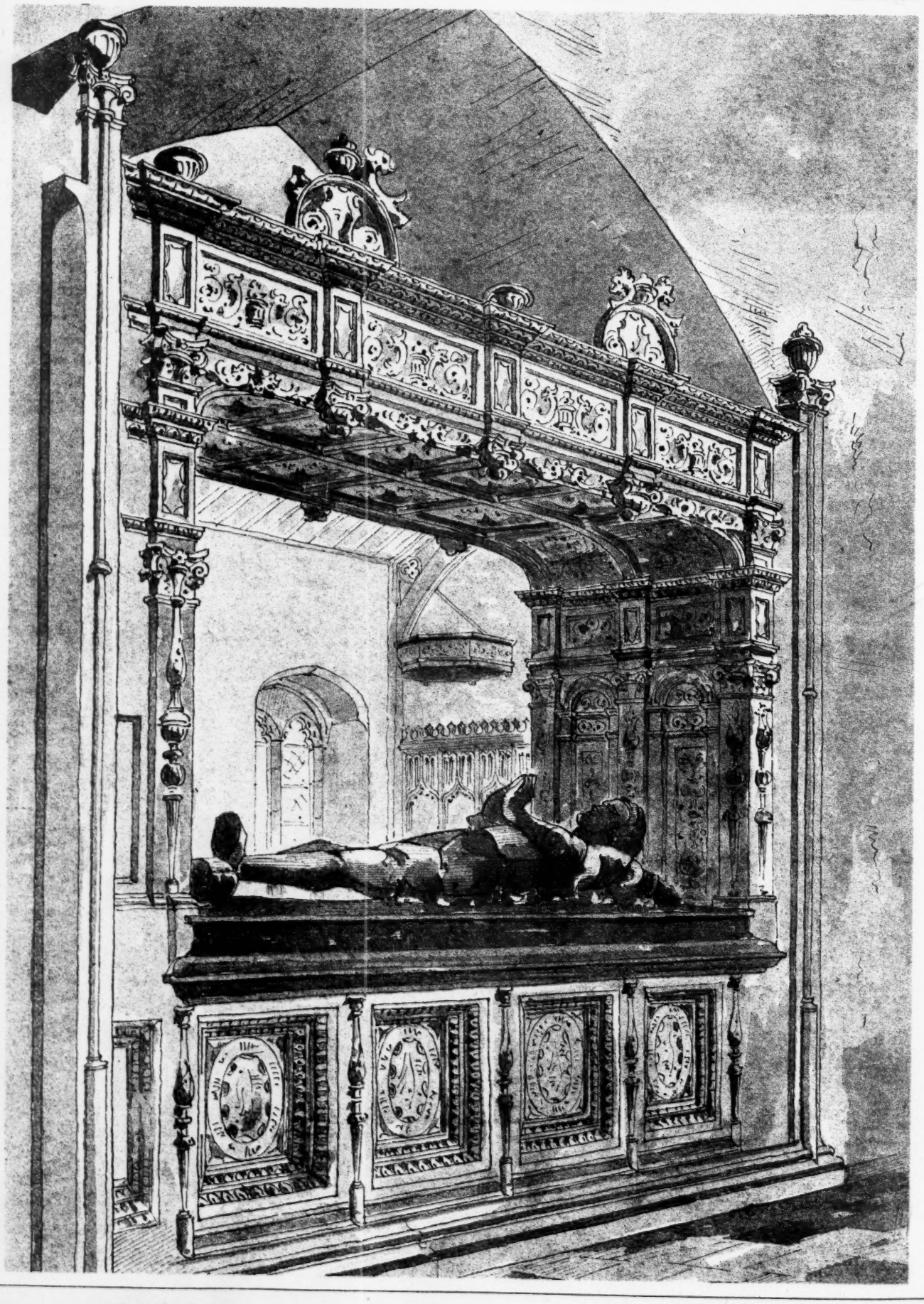
CYLINDERS FOR HOT-WATER CIRCULATION.

LONDON:
352 to 362, Euston-road.

LIVERPOOL:
6 and 8, Hatton Garden.

GLASGOW:
Petershill-road.

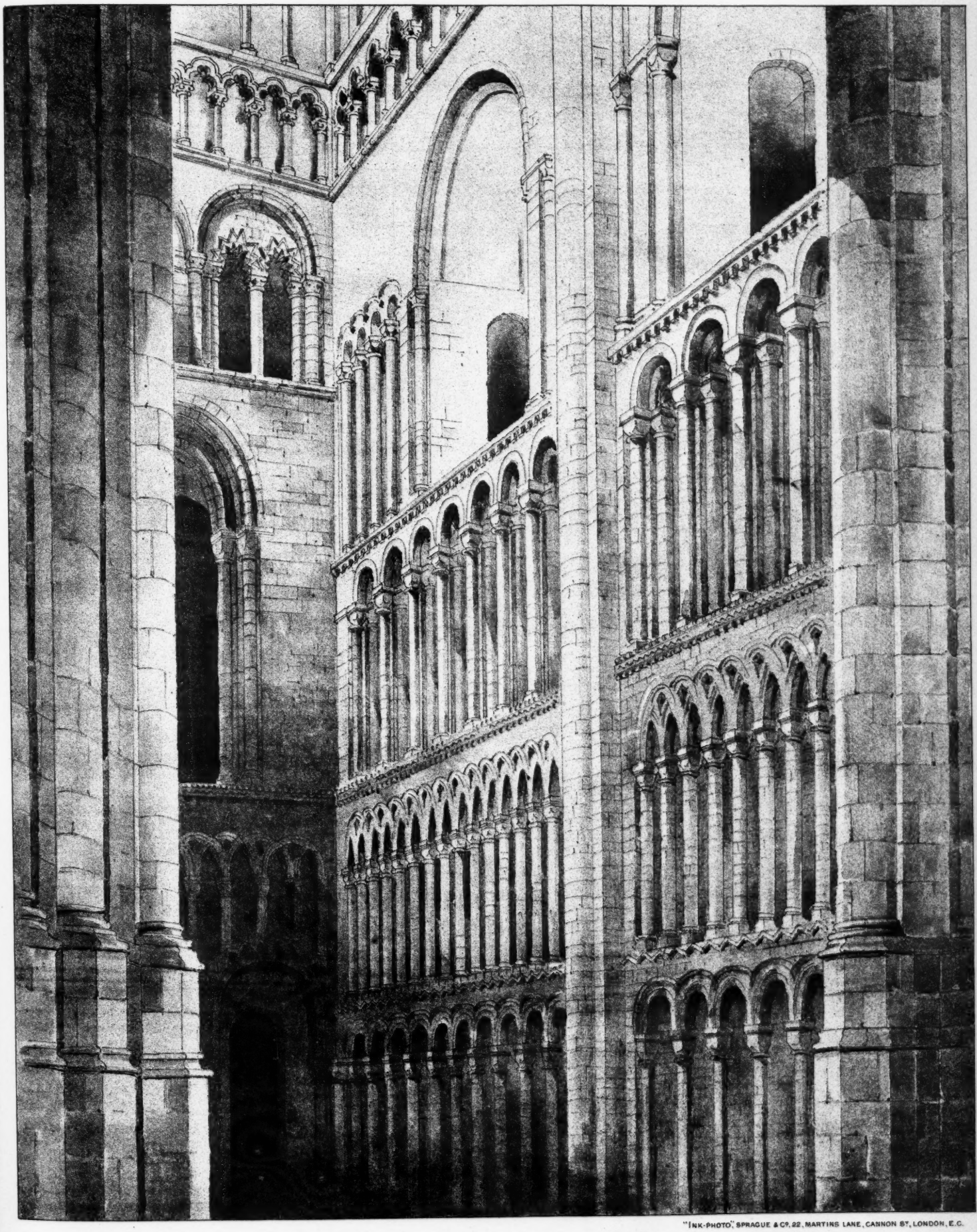




"INK-PHOTO" SPRAGUE & Co. 22, MARTINS LANE, CANNON ST, LONDON, E.C.

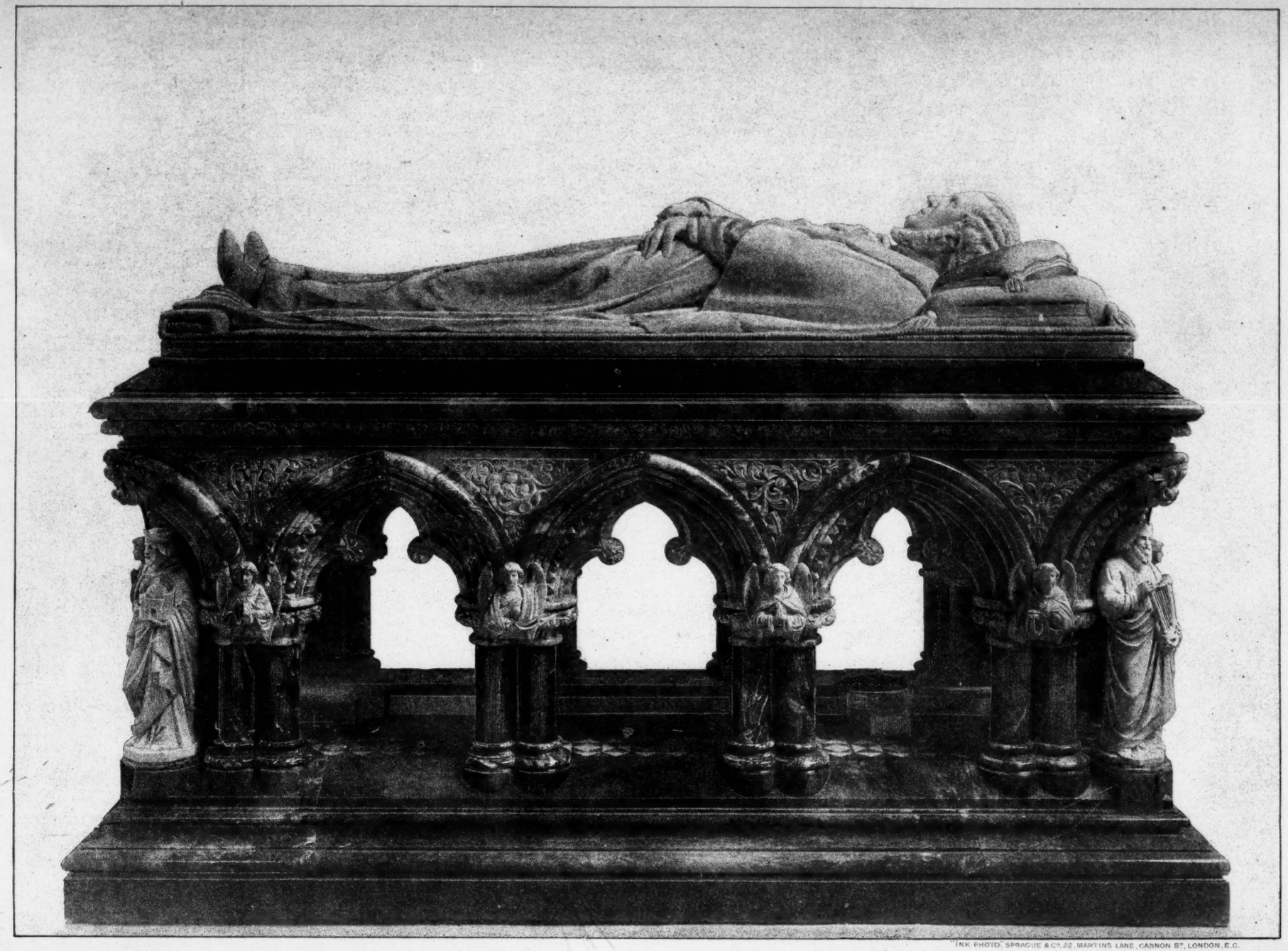
TOMB OF LORD HENRY MARNEY, LAYER MARNEY CHURCH, ESSEX.

FROM A DRAWING BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.



"INK-PHOTO," SPRAGUE & Co., 22, MARTINS LANE, CANNON ST., LONDON, E.C.

A CORNER OF ELY CATHEDRAL.—FROM A DRAWING BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.



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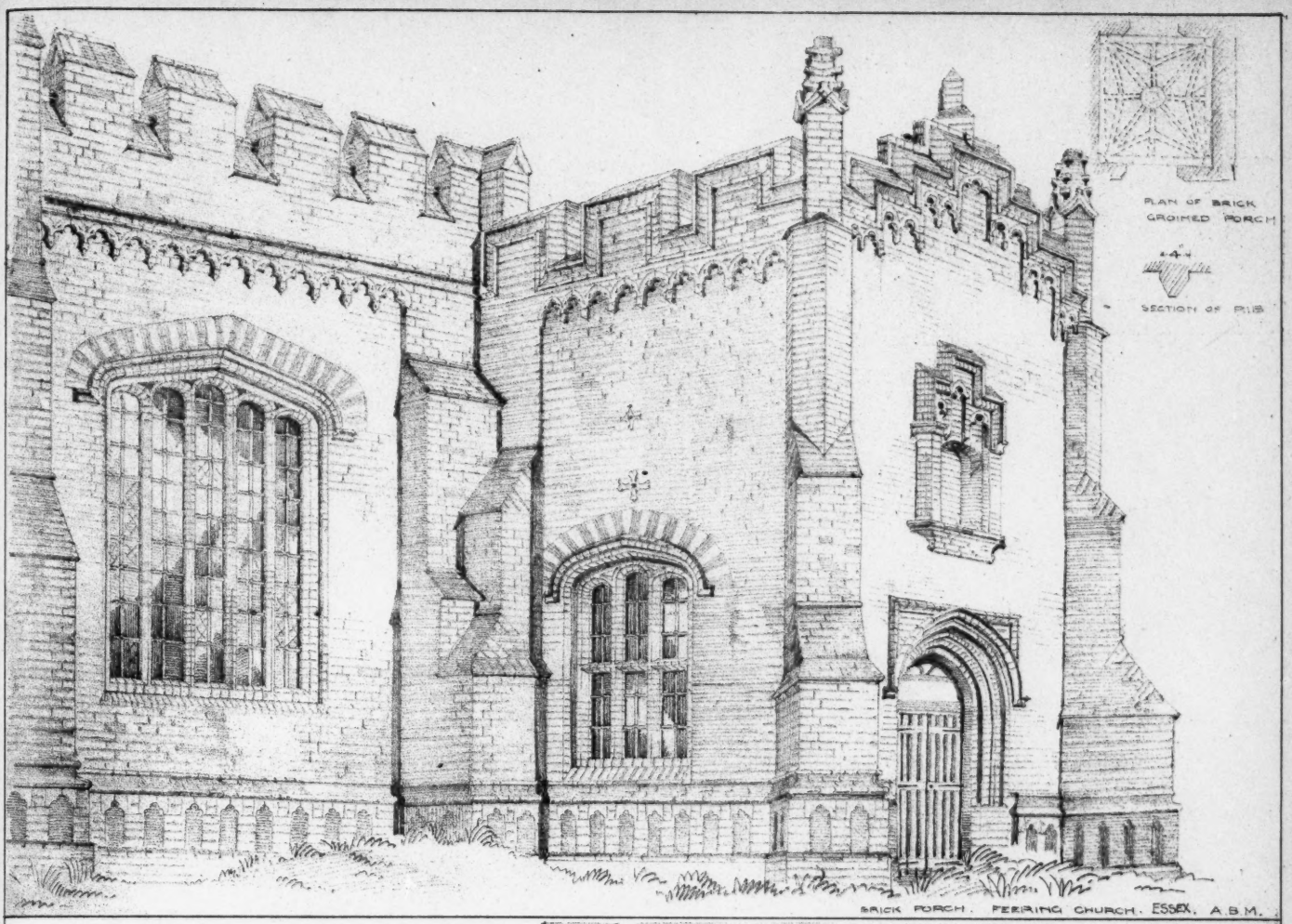
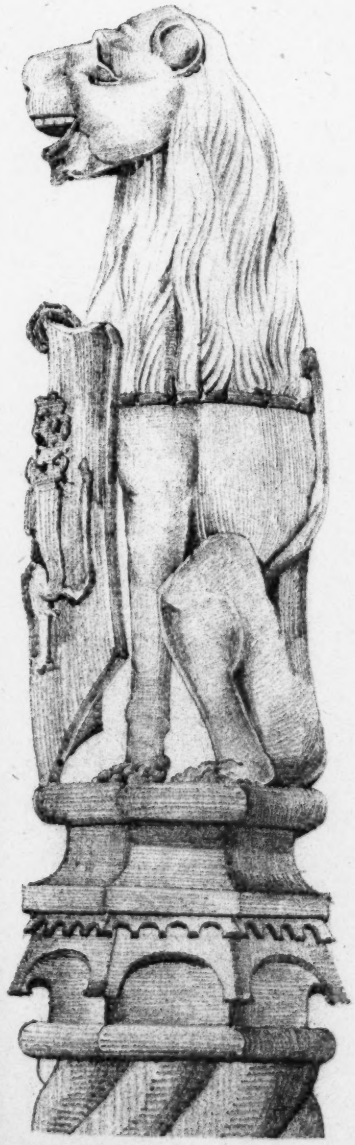
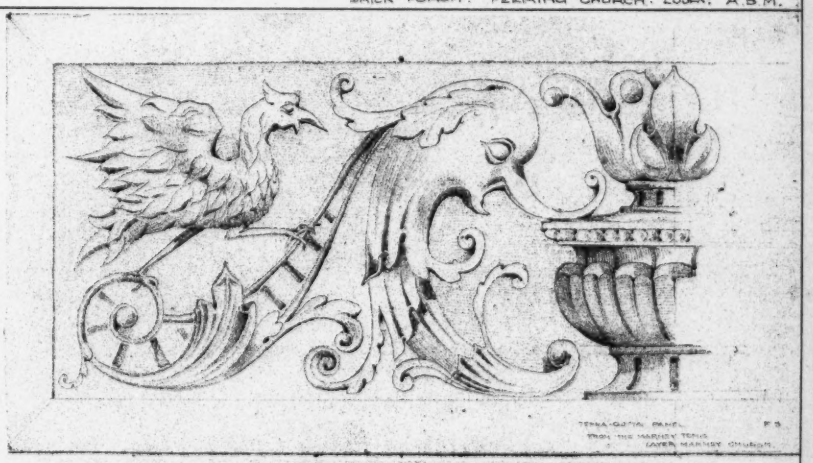
THE DUDLEY MEMORIAL, WORCESTER CATHEDRAL.—Mr. James Forsyth, Sculptor.

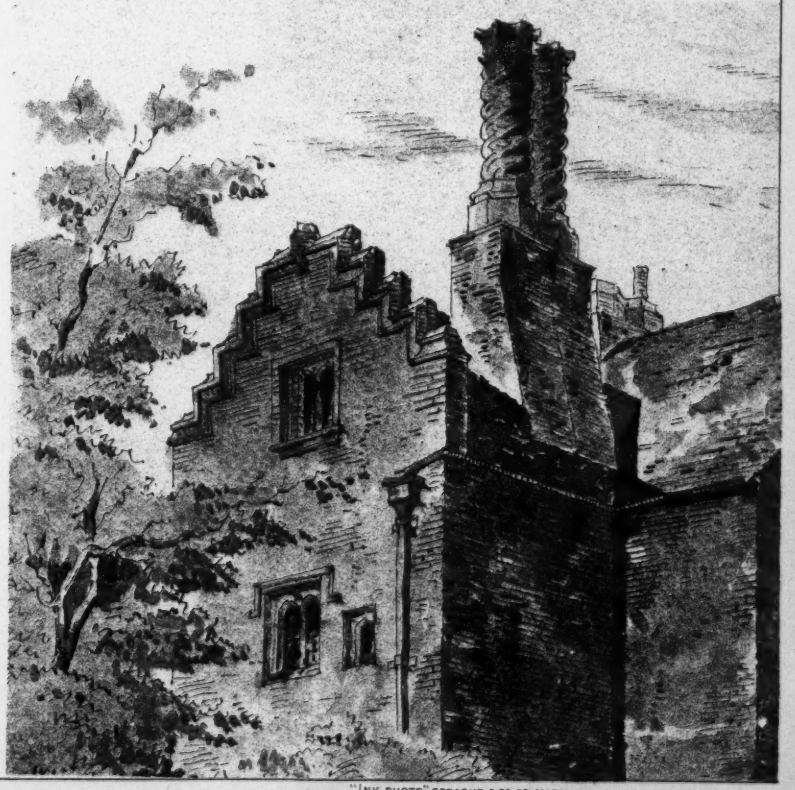


BRICK PORCH, FEERING CHURCH, ESSEX. A.B.M.



LEOPARD CARVED IN OAK IN THE CHURCH, LAYER MARNEY.





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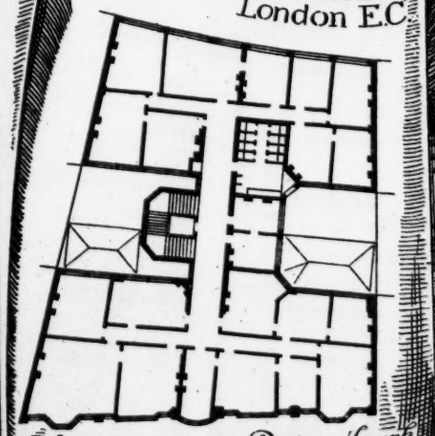
SKETCHES AT AND NEAR LAYER MARNEY, ESSEX.—By Mr. Arnold B. Mitchell, A.R.I.B.A.

St George's House Eastcheap
London E.C



Delissa Joseph
Architect

·St GEORGE'S·HOUSE·

BANK

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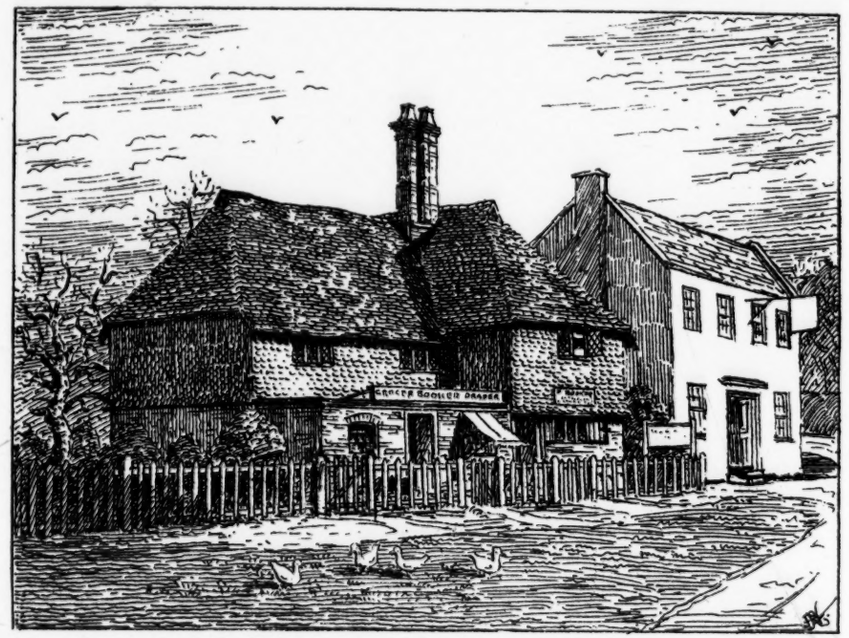
AT ALFOLD.

AT ALFOLD.



AT ALFOLD.

ALFOLD HOUSE.

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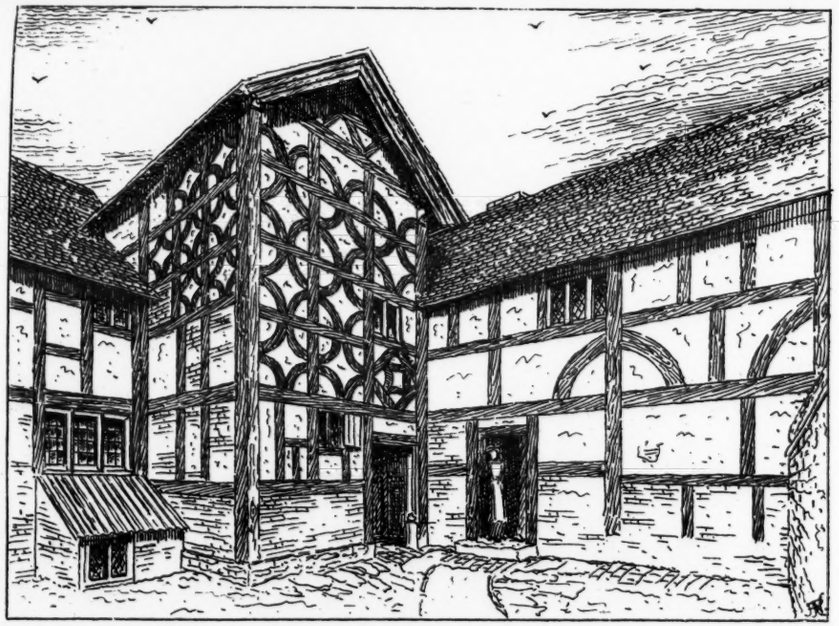
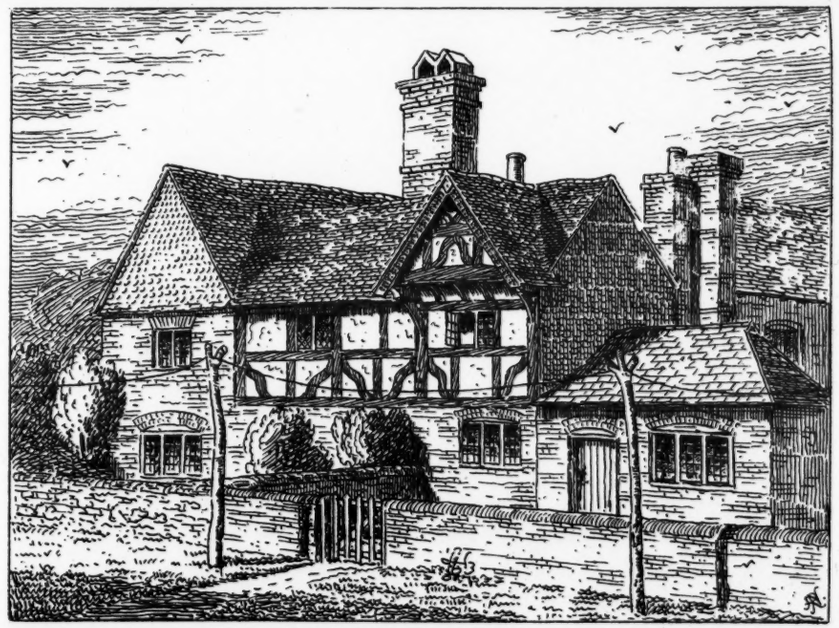
OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.



AT BRAMLEY.



AT SHAMLEY GREEN.

PLUNKS: SHAMLEY GREEN.

AT SHAMLEY GREEN.

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OLD COTTAGE ARCHITECTURE.—From Sketches by Mr. Ralph Nevill, F.S.A.